U-matic

VIDEOCASSETTE RECORDER

VO-5850P

Revised-3

This manual includes the informations of Supplement-1 that has been published already.

SONY®

SERVICE MANUAL

SPECIFICATIONS

GENERAL

Video recording: Rotary two-head helical scan system
Luminance: fm recording
Color signal: converted subcarrier direct recording

Video signal system: CCIR standards, PAL color

Power requirements: 110 - 240 V ac ± 10%, 50/60 Hz ± 10%

Power consumption: 75 W with RM-440

Operating position: Horizontal

Storage temperature: −20° C to +60° C (−4° F to +140° F)

Operating temperature: 5° C to 40° C (41° F to 104° F)

Dimensions: Approx. 446 x 237 x 518 mm (w/h/d)
(17-5/8 x 9-3/8 x 20-1/2 inches)
including projecting parts and controls

Weight: Approx. 25 kg (55 lb)

VIDEO

VIDEO IN: BNC type, x2
with 75 ohm termination switch and loop-through output
1.0 V (p-p) $^{+1.0}_{-0.5}$ V (p-p), 75 ohms, unbalanced, sync negative

DUB IN: 7 pin, x1

TV: 8 pin, x1

VIDEO OUT: BNC type, x2
1.0 V (p-p) ±0.2 V (p-p), 75 ohms, unbalanced, sync negative

DUB OUT: 7 pin, x1

Horizontal resolution: Monochrome mode: 340 lines
Color mode: 250 lines

Signal-to-noise ratio: Monochrome mode: more than 48 dB
Color mode: more than 46 dB

SC IN: BNC type, x1
2 V (0.5 - 3 V) (p-p), 75 ohms, unbalanced, sync negative

EXT SYNC IN: BNC type, x1
4 V (2 - 5 V) (p-p), 75 ohms, unbalanced, sync negative

Recording level: Automatic and manual

AUDIO

LINE CH-1, CH-2 IN: Phono jack, x 1 in each
−10 dB, 47 k ohms

MIC CH-1, CH-2: Phone jack, x 1 in each
−60 dB, for 600 ohm microphones

TV: 8 pin, x1

LINE CH-1, CH-2 OUT:
Phono jack, x 1 in each
−5 dB (with 47 k ohms load)

HEADPHONES: Stereo phone jack, x1
for 8 ohm headphones
Level: adjustable (−24 dB to −46 dB)

Signal-to-noise ratio: Better than 48 dB (at 3% distortion)
Both channels 1 and 2

Frequency response: 50 - 15,000 Hz (channels 1 and 2)

Recording level adjustment:
Manual, with audio limiter

EDIT

Assemble: Video and audio channel 1 and audio channel 2 (simultaneously)

Insert: Video, audio channel 1 and/or audio channel 2 independently (selectable)

Preroll: Possible

Automatic editing: Possible with the RM-440 Automatic Editing Control (optional)
Accuracy: ±2 frames

SPECIAL FUNCTIONS

Pause: A still picture is obtained, with long pause function

Search: Possible (still, and 1/30 to 5 times of normal speed in forward and reverse directions)
Picture search is possible with the RM-440 when the KCS type tape is used

Tracking control: Possible

Skew control: Possible

Sync system: Internal and external

Vertical-interval switcher:
Internal

Dropout compensator: Internal

TAPE TRANSPORT

Tape speed: 9.53 cm/sec. (3-3/4 ips)

Recording or playback time:
60 min (with KCA-60)

Fast forward and rewind time:
within 4 min (with KCA-60)

Wow and flutter: 0.25% (DIN)

Tape compatibility: U-matic video cassette tape

Usable tape: KCA, KCS type tape

ACCESSORY SUPPLIED

AC power cord 1

RECOMMENDED VIDEO EQUIPMENTS AND ACCESSORIES

Editing Control Unit RM-440
Color Video Monitor Sony CVM and PVM series
Color Video Camera Sony DXC series
Auto Search Control RX-353CE, RX-303CE
Remote Control
Cleaning Cassette KC-1C
Remote Control Cable RCC-5F
Dubbing Cable VDC-5 (5 m)
Monitor Connecting Cable VMC-3P (3 m), VMC-5P (5 m), VMC-10P (10 m)
Video Responder System VRC-100, VRS-100, VRD-100, VRP-100

TABLE OF CONTENTS

1. GENERAL DESCRIPTION

1-1. Features 1-1
1-2. Note on Videocassette Tape 1-1
1-3. Location and Function of Controls 1-2
1-4. Connections and Select SW Setting 1-4
1-5. Automatic Electronic Editing 1-8
1-6. Auto Search Control 1-10
1-7. Note on Mode 1-10

2. SERVICE INFORMATION

2-1. Disassembly of Cabinet 2-1
2-2. Cassette-Up Compartment Removal and Installing Procedures 2-2
2-3. Main Parts Location 2-3
  2-3-1. Location of the Printed Circuit Boards 2-3
  2-3-2. Location of the Mechanical Main Parts/Components 2-5
2-4. Spare Parts 2-7
2-5. Select Switch Setting 2-7
2-6. Cassette Removal Procedure when Normal Ejection is not Possible 2-7
2-7. To Operate the Machine without Installing Cassette Tape 2-8
2-8. To Set Up 10 Times Picture Search Mode without RM-440 2-8
2-9. Tape Slack Detector 2-9
2-10. Stop (E-to-E) Mode 2-9
2-11. Fixture 2-9
2-12. Printed Circuit Board 2-9
2-13. Cassette-Up Compartment Operation 2-10
2-14. Tape Tension Control Mechanism 2-11
2-15. Timing of Switch, Motor and Solenoid 2-12

3. PERIODIC CHECK AND MAINTENANCE

3-1. Maintenance After Repairs 3-1
3-2. Periodic Check 3-1
3-3. Hours Meter 3-1
3-4. Others 3-1

4. REPLACEMENT OF MAJOR PARTS

4-1. Replacement of Upper Drum Assembly 4-1
4-2. Replacement of Drum Assembly 4-2
4-3. Replacement of Capstan Motor 4-3
4-4. Replacement of CTL PB Head 4-3
4-5. Replacement of Brush 4-4
4-6. Replacement of S Drawer Roller 4-4
4-7. Replacement/Adjustment of Tape Guides on Threading Ring 4-5
4-8. Replacement of CX-194A 4-6
4-9. Adjustment Item Table After Main Parts Replacement 4-7

5. LINK AND DRIVE SYSTEM ALIGNMENT

5-1. Reel Table System Adjustment 5-1
  5-1-1. Cassette Holder Position Adjustment 5-1
  5-1-2. Reel Table Height and Vertical Play Adjustment 5-1
5-2. T Drawer Arm Adjustment 5-3
  5-2-1. T Drawer Arm Eject Position Adjustment 5-3
  5-2-2. Unthread-end Switch Position Adjustment 5-3
5-3. Threading System Adjustment 5-4
  5-3-1. Threading Ring Rotation Adjustment 5-4
  5-3-2. Gear Box Position Adjustment 5-5
  5-3-3. Pinch Roller Self-Alignment Adjustment 5-6
  5-3-4. FR Detector Block Mounting Position Adjustment 5-7
5-4. Pinch Lever Block Adjustment 5-8
  5-4-1. Pinch Lever Pre-set Adjustment 5-8
  5-4-2. Pinch Roller Pre-set Adjustment 5-9
  5-4-3. Pinch Solenoid Block Position Adjustment 5-10
5-5. T Tape Sensor Position Adjustment 5-11
5-6. Tension Arm System Adjustment 5-12
  5-6-1. S Drawer Roller Ass'y Limiter Adjustment 5-12
  5-6-2. T Tension Regulator Operating Position Adjustment 5-12
  5-6-3. S Tension Regulator Operating Position Adjustment 5-13
  5-6-4. Tension Detector Position Adjustment 5-14
5-7. 10 Times Picture Search Operating Position Adjustment 5-14
5-8. Solenoid System Adjustment 5-16
  5-8-1. Search Solenoid Mounting Position Adjustment 5-16
  5-8-2. Skew Solenoid Mounting Position Adjustment 5-17
  5-8-3. T Idler Solenoid Position Adjustment 5-18
  5-8-4. S Idler Solenoid Position Adjustment 5-19
  5-8-5. Pinch Solenoid Mounting Position Adjustment 5-20
  5-8-6. 10 Times Picture Search Solenoid Mounting Position Adjustment 5-20
  5-8-7. T Brake Solenoid Position Adjustment 5-21
  5-8-8. S Brake Solenoid Position Adjustment 5-22
5-9. Cassette-up Compartment Adjustment 5-22
  5-9-1. Cassette-in Switch Position Adjustment 5-22
  5-9-2. Cassette-down Switch Position Adjustment 5-23
5-10. Brush Position Adjustment 5-24
5-11. Leaf Spring Position Adjustment 5-25
5-12. Pinch Lever Right Angle Adjustment 5-26

6. BACK TENSION AND TORQUE ALIGNMENT

6-1. Brake System Adjustment 6-1
  6-1-1. S Brake Torque Adjustment 6-1
  6-1-2. T Brake Torque Adjustment 6-2
  6-1-3. Rew Brake Torque Adjustment 6-3
6-2. FF/REW Torque Adjustment 6-3
6-3. FWD Torque Adjustment 6-4
6-4. REV Torque Adjustment 6-5
6-5. FF Back Tension Adjustment 6-6
6-6. FWD Back Tension Adjustment 6-7

7. TAPE RUN ALIGNMENT

7-1. FF/REW Modes Tape Path Adjustment 7-1
7-2. T Correction Guide Slantness Adjustment 7-2
7-3. FWD Mode Tape Path Adjustment (1) 7-2
7-4. FWD Mode Tape Path Adjustment (2) 7-3
7-5. REV Mode Tape Path Adjustment 7-3
7-6. Tape Path Adjustment Around Pinch Roller 7-4
  7-6-1. Tape Wrinkle Remove Adjustment 7-4
  7-6-2. Pinch Roller Slantness Adjustment 7-4
7-7. 10 Times Picture Search • Tape Path Adjustment 7-5
7-8. Tracking Adjustment 7-6
  7-8-1. Video Tracking Adjustment 7-6

7-8-2. CTL PB Head Height/Azimuth/Zenith Adjustments . . . 7-10
7-8-3. Audio Head Height Adjustment . . . 7-12
7-8-4. Audio Head Zenith Adjustment . . . 7-12
7-8-5. Audio Head Azimuth Adjustment . . . 7-13
7-8-6. Audio Head Phase Adjustment . . . 7-14
7-8-7. Audio/CTL Head Position Adjustment . . . 7-15
7-9. Video Head Dihedral Adjustment . . . 7-16

8. POWER SUPPLY AND SYSTEM CONTROL ALIGNMENT

8-1. Reg 12 V Adjustment (Switching Regulator) . . . 8-1
8-2. Reg 5 V Adjustment for System Control . . . 8-1
8-3. Tape Sensor Balance Adjustment . . . 8-1

9. SERVO SYSTEM ALIGNMENT

9-1. Vcc Adjustment for Servo IC . . . 9-2
9-2. AUDIO/CTL Head Position Adjustment . . . 9-2
9-3. Tracking Multi Adjustment . . . 9-2
9-4. Drum ϕ^2 Adjustment . . . 9-3
9-5. Switching Position Adjustment . . . 9-4
9-6. Capstan Search x 1 Speed Adjustment . . . 9-5
9-7. Capstan Search x 1/30 Speed Adjustment . . . 9-5
9-8. Capstan Search x 1/15 Speed Adjustment . . . 9-5
9-9. Capstan Search x 1/2 Speed Adjustment . . . 9-5
9-10. Capstan FWD/REV Detector Adjustment . . . 9-6
9-11. Capstan Free Speed Adjustment . . . 9-6
9-12. Capstan STOP Servo Adjustment . . . 9-6
9-13. Drum AFC Bias Adjustment . . . 9-7
9-14. Drum AFC Transient Adjustment . . . 9-7
9-15. Picture Splitting Compensator Adjustment . . . 9-8
9-16. Reel Servo Adjustment . . . 9-8
  9-16-1. x10 Picture Search Speed Adjustment . . . 9-8
  9-16-2. Still Speed Adjustment . . . 9-9
9-17. Color Framing Adjustment . . . 9-10
  9-17-1. Ref. 135° Burst Pulse Width Adjustment . . . 9-10
  9-17-2. PB 135° Burst Pulse Width Adjustment . . . 9-10
9-18. Rec. VD Adjustment . . . 9-10

10. AUDIO SYSTEM ALIGNMENT

10-1. PB Output Frequency Response Adjustment . . . 10-3
10-2. "AUDIO LEVEL" Control Setting/Meter Calibration Adjustment . . . 10-3
10-3. PB Output Level Adjustment . . . 10-3
10-4. Audio Bias, Erase Frequency Adjustment . . . 10-3
10-5. Audio Bias Current Adjustment . . . 10-4
10-6. Bias Trap Adjustment [Rec.]-1 . . . 10-4
10-7. Bias Trap Adjustment [Rec.]-2 . . . 10-4
10-8. Audio Limiter Gain Adjustment . . . 10-4
10-9. Rec. Level Adjustment . . . 10-5
10-10. Insert Bias Frequency Adjustment . . . 10-5
10-11. Insert Bias Trap Adjustment . . . 10-5
10-12. Cross Talk Cancel Adjustment . . . 10-6

11. VIDEO SYSTEM ALIGNMENT

11-1. Playback RF Amplifier Adjustment . . . 11-2
  11-1-1. PB RF Frequency Response Adjustment . . . 11-2
  11-1-2. PB Y-RF Output Balance Adjustment . . . 11-3
  11-1-3. PB Y-RF Output Level Adjustment . . . 11-4
  11-1-4. PB Chroma-RF Output Balance Adjustment . . . 11-4
  11-1-5. PB Chroma-RF Output Level Adjustment . . . 11-4
  11-1-6. Chroma-RF Bias Trap Adjustment . . . 11-5
  11-1-7. PB Chroma Frequency Response Adjustment . . . 11-5
11-2. Y Demodulator Adjustment . . . 11-6
  11-2-1. B/W Mode Video Output Level Adjustment . . . 11-6
  11-2-2. Color Mode Y Output Level Adjustment . . . 11-6
  11-2-3. Video Output Level Adjustment . . . 11-6
  11-2-4. Noise Canceller Adjustment . . . 11-7
  11-2-5. Drop-Out Compensator Frequency Response Adjustment . . . 11-7
  11-2-6. Color-Y Phase Equalizing Adjustment . . . 11-8
  11-2-7. Tracking Meter Calibration Adjustment . . . 11-8
  11-2-8. Carrier Balance Adjustment . . . 11-9
  11-2-9. D.O.C. DC Balance and Level Adjustment . . . 11-9
  11-2-10. Drop-Out Compensator Sensitivity Level Adjustment . . . 11-10
  11-2-11. Dub Y Stil VD Adjustment . . . 11-10
11-3. Y Modulator Adjustment . . . 11-11
  11-3-1. FM Deviation Adjustment . . . 11-11
  11-3-2. Modulator Balance Adjustment . . . 11-11
  11-3-3. Sync Tip Carrier Frequency Adjustment . . . 11-11
  11-3-4. Y Phase Equalize Adjustment . . . 11-12
  11-3-5. White Clip Adjustment . . . 11-12
  11-3-6. Color Mode, Y-Channel's 4.43 MHz Trap Adjustment . . . 11-13
  11-3-7. Smear Compensator Adjustment . . . 11-13
  11-3-8. Video Meter Calibration Adjustment . . . 11-13
11-4. Chroma Demodulator Adjustment . . . 11-14
  11-4-1. 4.43 MHz Reference Oscillator Frequency Adjustment . . . 11-14
  11-4-2. 5.12 MHz Tuning Adjustment . . . 11-14
  11-4-3. VCO Level Adjustment . . . 11-14
  11-4-4. PB A.C.C. Burst Frag Adjustment . . . 11-15
  11-4-5. PB A.P.C. Burst Frag Adjustment . . . 11-15
  11-4-6. PB A.C.C. Level (Color Killer) Adjustment . . . 11-16
  11-4-7. Chroma Converter Balance Adjustment . . . 11-16
  11-4-8. Dub Chroma Output Level Adjustment . . . 11-16
  11-4-9. PB A.P.C. Gain Adjustment . . . 11-17
  11-4-10. Y/C Mix Level Adjustment . . . 11-17
  11-4-11. Differential Gain Adjustment . . . 11-17
11-5. Chroma Modulator Adjustment . . . 11-18
  11-5-1. 5.12 MHz Oscillator Frequency Adjustment . . . 11-18
  11-5-2. Rec Chroma Frequency Response Adjustment . . . 11-18
  11-5-3. Rec A.P.C. Burst Tuning Adjustment . . . 11-18
  11-5-4. Rec A.C.C. Level Adjustment . . . 11-19
  11-5-5. Rec Color Framing Detector Adjustment . . . 11-19
11-6. Record Amplifier Adjustment . . . 11-20
  11-6-1. Y-Rec Current Frequency Response Adjustment . . . 11-20
  11-6-2. Y-Rec Current Level Adjustment . . . 11-21
  11-6-3. Chroma-Rec Current Level Adjustment . . . 11-21
11-7. Y/Chroma Delay Time Adjustment . . . 11-22
  11-7-1. PB Y/Chroma Delay Time Adjustment . . . 11-22
  11-7-2. Rec Y/Chroma Delay Time Adjustment . . . 11-23
  11-7-3. Dub Y/Chroma Delay Time Adjustment . . . 11-24

12. EDITING SYSTEM ALIGNMENT

12-1. Rotary Erase Current Adjustment . . . 12-1

13. BLOCK DIAGRAM AND TIMING CHARTS

Head Location 13-1
Tape Pattern 13-1
Frequency Allocation 13-2
Circuit Function of the Printed Circuit Board 13-3
Overall Block Diagram 13-4
Video Modulator Block Diagram 13-6
Video Demodulator Block Diagram 13-9
Servo System Block Diagram 13-12
Servo System Timing Chart 13-15
Audio System Block Diagram 13-18
Video System Flow Chart 13-21
Servo System Flow Chart 13-24
Audio System Flow Chart 13-27

14. PRINTED WIRING BOARD AND SCHEMATIC DIAGRAMS

Location of Main Parts 14-1
Semiconductor Electrodes 14-3

Video

MP-12A/CB-6/PT-9 14-15
DM-22A/DL-2/CL-4 14-28
CF-7 14-41

Edit

RE-5 14-45

Blanking SW

BS-3 14-47

Audio

AU-21 14-49
MI-3/HP-3 14-56
EC-19/AH-3 14-57
MC-17 14-58

Servo

SV-31A 14-63
MR-6/PT-9/FR-11/PH-5 14-78

Power

UR-02 (SWITCHING REGULATOR) 14-84
AC-27/AC-36/AC-35 14-89
DC-10A/PT-9 14-90

Function Key

KY-13A/DP-10 14-93

System Control

PD-16/SW-43/PH-4 14-98
ML-1/PH-5/LM-7/SW-46/SW-50 14-101
CC-9/CC-10/CC-11 14-102
SY-68A/PT-9 14-105

FRAME 14-121

15. SPARE PARTS AND FIXTURE

15-1. Parts Information 15-1
15-2. Exploded View 15-1
  Supply Side Reel Chassis 15-5
  Take-up Side Reel Chassis 15-7
  Reel Chassis (bottom view) 15-9
  Tape Threading Block 15-11
  Supply and Take-up Threading Arms 15-13
  Drum Block and Capstan 15-15
  Erase Head Base and S Guard 15-17
  Pinch Lever and Pinch Solenoid 15-19
  Cassette-up Compartment 15-21
  Function Control 15-23
  Chassis (bottom view) 15-25
  Chassis (rear view) 15-27
  Meter Panel 15-29
  Printed Circuit Boards 15-31
  Ornamental Panel 15-33
  Ornamental Panel (control panel) 15-35
  Switching Regulator (UR-02) 15-37
15-3. Electrical Parts List 15-38
15-4. Packing Material and Accessory (Supplied) 15-76
15-5. Fixture (Optional) 15-76

SECTION 1
GENERAL DESCRIPTION

1-1. FEATURES

Full editing capability

All essential functions for electronic editing, rotary erase head, vertical interval switcher and capstan servo are, of course, incorporated in the VO-5850P, plus a number of additional functions such as framing servo and ϕ^2 loop servo to make high-quality editing possible. A new type playback amplifier, a dropout compensator and a noise eliminator insure that you will always have a high-quality picture.

When a RM-440 Automatic Editing Control Unit is connected, you have a totally automatic editing system.

Search operation

Governed by the search dial, playback at 1/30 to 5 times normal speed is possible in both forward and reverse directions. When a KCS cassette is used, picture search (at about 10 times normal playback speed) is also possible with the search dial on the RM-440.

Preroll function

The PREROLL button makes it easy to achieve a stable picture at the edit-in point.

Dubbing connectors

Connectors for editing or duplicating video signals are included.

LED time counter

The time counter reads the CTL signals recorded on the tape and the LEDs indicate the point on the tape in seconds and minutes.

Mark-in function

Any particular point on the tape can be easily and quickly located using the MARK IN button.

Still picture

When the tape is stopped with the PAUSE button during playback, a still picture can be obtained. The guard band noise is limited to the upper or lower part of the screen so that the still picture is easy to see.

Long pause mode

When the tape is stopped in the pause mode for a long period of time, the machine automatically enters the long pause mode to avoid possible damage to the tape.

Moisture detector

When moisture condenses on the video head drum, the moisture detector is activated and the machine stops to avoid possible tape damage. The AUTO OFF indicator lights to indicate moisture condensation.

Remote control and auto search

The machine can be remotely controlled with an optional remote control unit. Any point on the tape can be searched for and played back automatically using an RX-353CE or RX-303CE Auto Search Control Unit.

Connectors for time base corrector

The best possible playback picture can be obtained when a time base corrector (optional) is connected.

Logic control

The logic control system allows you to change modes without pressing the STOP button.

Full automatic rewind

The tape is automatically rewound to the beginning when it runs to the end.

Video recording level adjustment

The video recording level can be adjusted automatically or manually.

Limiter function

The audio recording level is adjusted manually. The limiter circuit minimizes audio distortion at the program peaks.

Two audio tracks

Two audio tracks permits recording and playback of stereo sound or bilingual program material.

Stable playback picture

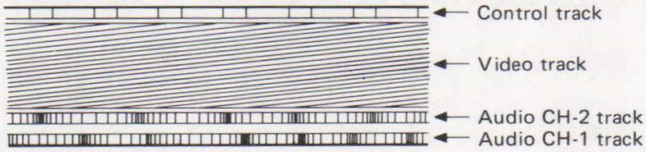
The servo system using a direct drive capstan motor and drum motor, and the newly developed digital servo IC assure a stable tape transport which reduces tape jitter.

No power adaptation and low power consumption

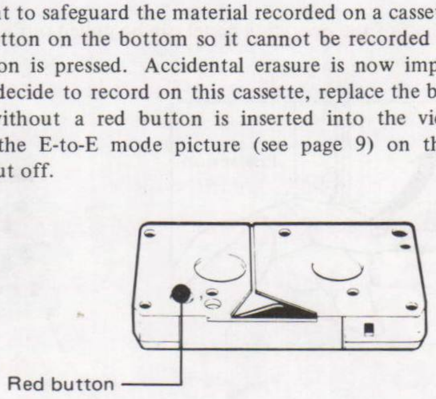
Thanks to Sony's newly-developed high efficiency switching regulator, the unit can be operated with a wide range of power voltages and frequencies without power adaptation. Power consumption is low.

1-2. NOTE ON VIDEOCASSETTE TAPE

The video and audio signals are recorded using the full width of the tape as shown below. Because of this, the tape cannot be recorded in the reverse direction.

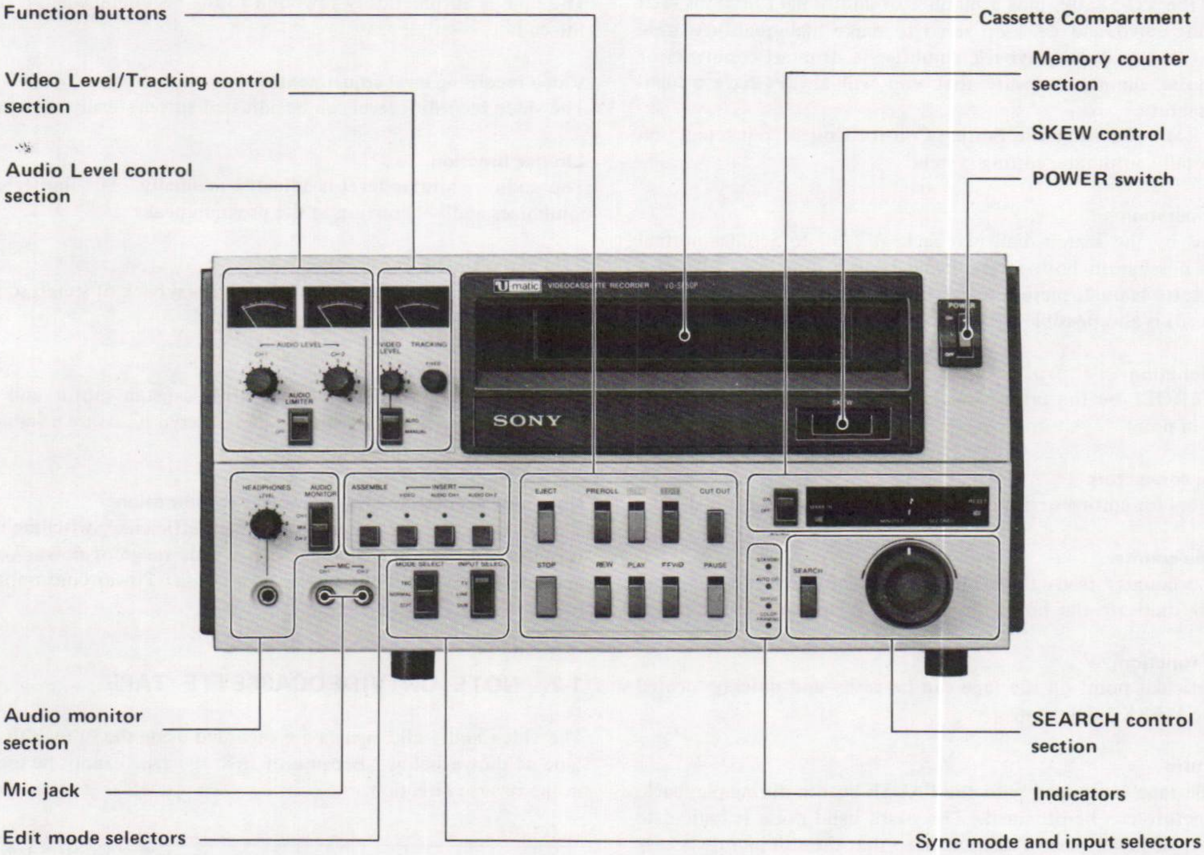


If you want to safeguard the material recorded on a cassette, remove the red button on the bottom so it cannot be recorded even if the REC button is pressed. Accidental erasure is now impossible. If you later decide to record on this cassette, replace the button. If a cassette without a red button is inserted into the videocassette recorder, the E-to-E mode picture (see page 9) on the monitor screen is cut off.



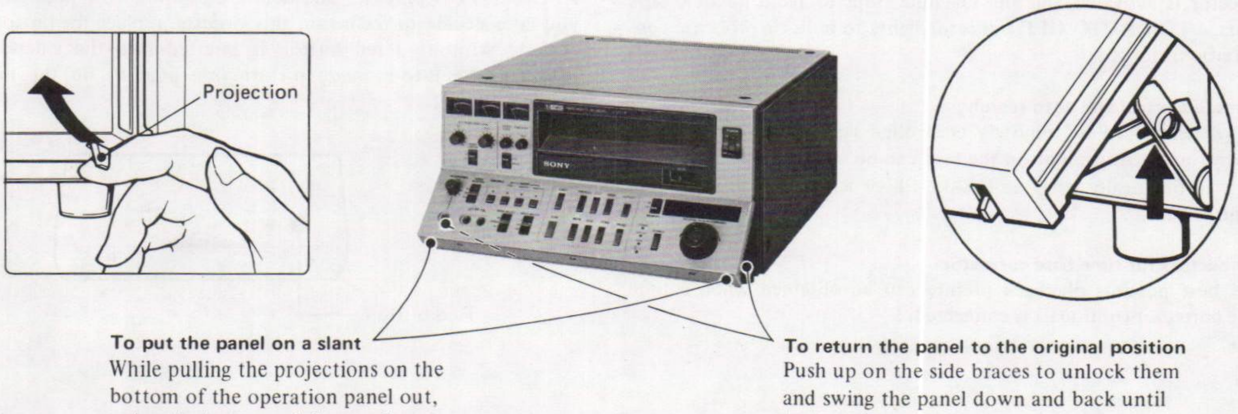
1-3. LOCATION AND FUNCTION OF CONTROLS

FRONT PANEL


Function buttons
Video Level/Tracking control section
Audio Level control section
Cassette Compartment
Memory counter section
SKEW control
POWER switch
SONY
Audio monitor section
Mic jack
Edit mode selectors
SEARCH control section
Indicators
Sync mode and input selectors

To put the Operation Panel on a Slant

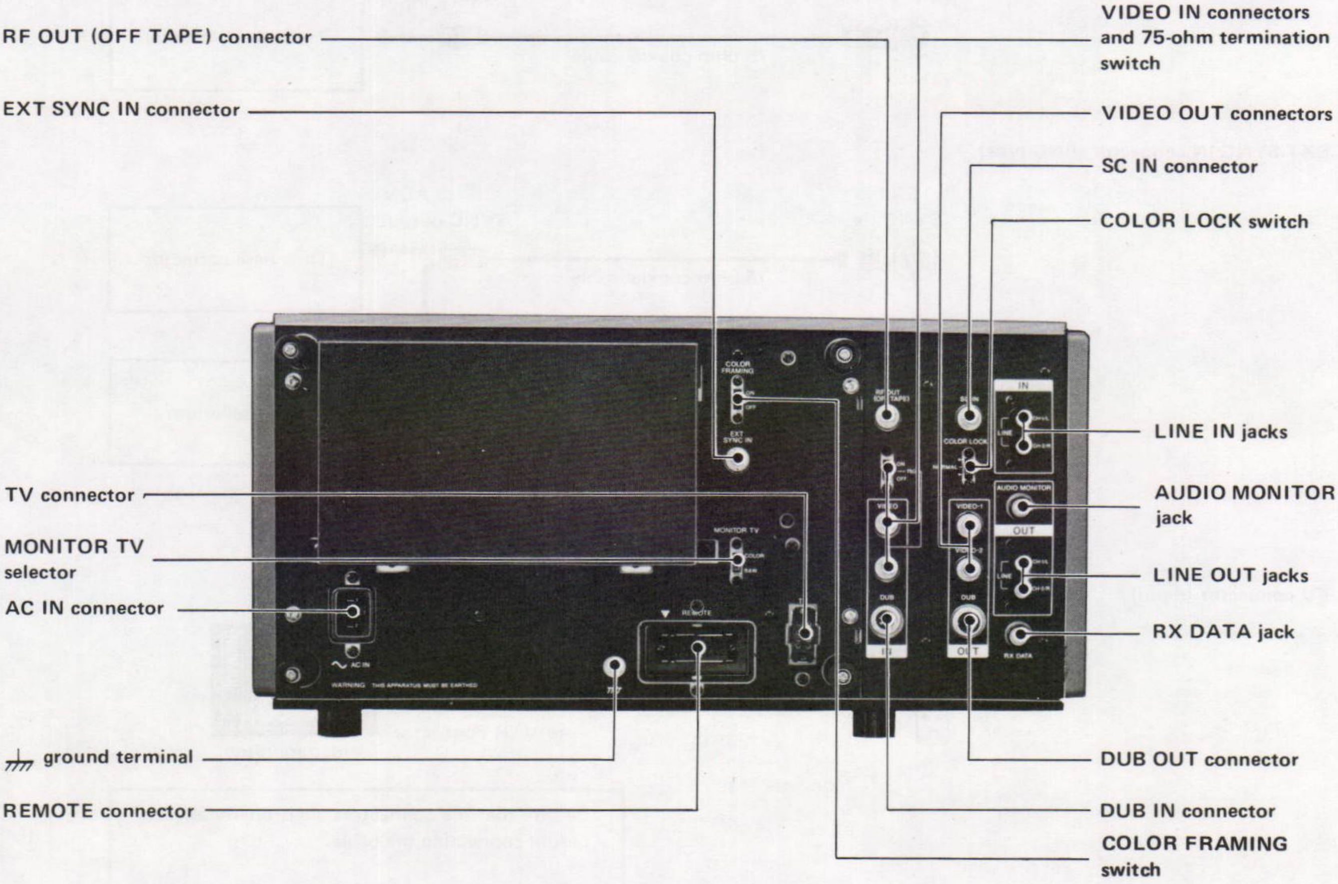
The lower half of the operation panel can be pulled out as shown below.


Projection

To put the panel on a slant
While pulling the projections on the bottom of the operation panel out, swing the bottom of the panel out and up until the side braces lock.

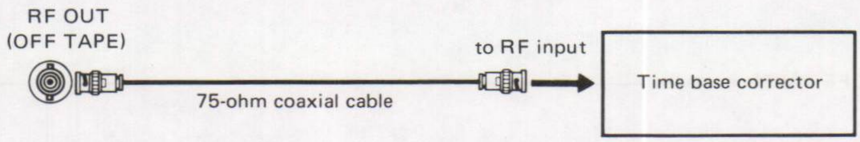
To return the panel to the original position
Push up on the side braces to unlock them and swing the panel down and back until it clicks into place.

REAR PANEL

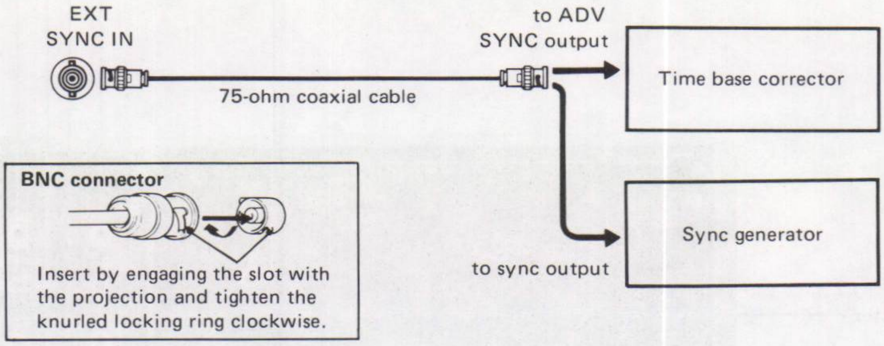

RF OUT (OFF TAPE) connector
EXT SYNC IN connector
TV connector
MONITOR TV selector
AC IN connector
ground terminal
REMOTE connector
VIDEO IN connectors and 75-ohm termination switch
VIDEO OUT connectors
SC IN connector
COLOR LOCK switch
LINE IN jacks
AUDIO MONITOR jack
LINE OUT jacks
RX DATA jack
DUB OUT connector
DUB IN connector
COLOR FRAMING switch

1-4. CONNECTIONS AND SELECT SW SETTING

RF OUT (OFF TAPE) connector (BNC type)

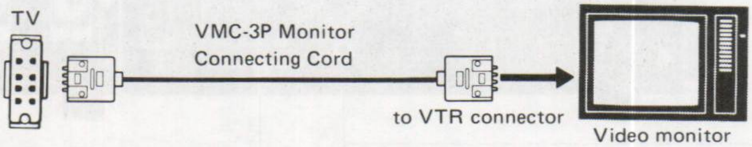

RF OUT
(OFF TAPE)
to RF input
75-ohm coaxial cable
Time base corrector

EXT SYNC IN connector (BNC type)

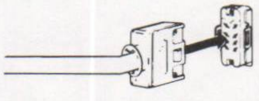

EXT
SYNC IN
to ADV
SYNC output
75-ohm coaxial cable
Time base corrector
BNC connector
Sync generator
to sync output

Insert by engaging the slot with the projection and tighten the knurled locking ring clockwise.

TV connector (8-pin)


TV
VMC-3P Monitor
Connecting Cord
to VTR connector
Video monitor

Be sure that the connectors are properly aligned before connecting the cable.



To remove, press the buttons on both sides of the connector.

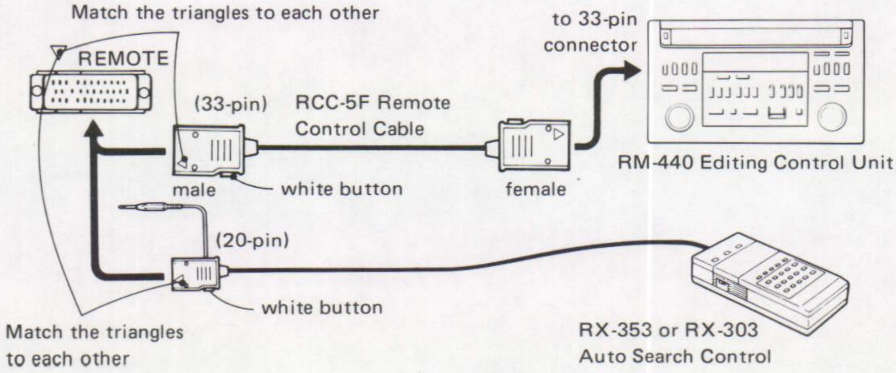
MONITOR TV selector

Set this selector according to the type of video monitor used.

COLOR: For a color monitor.

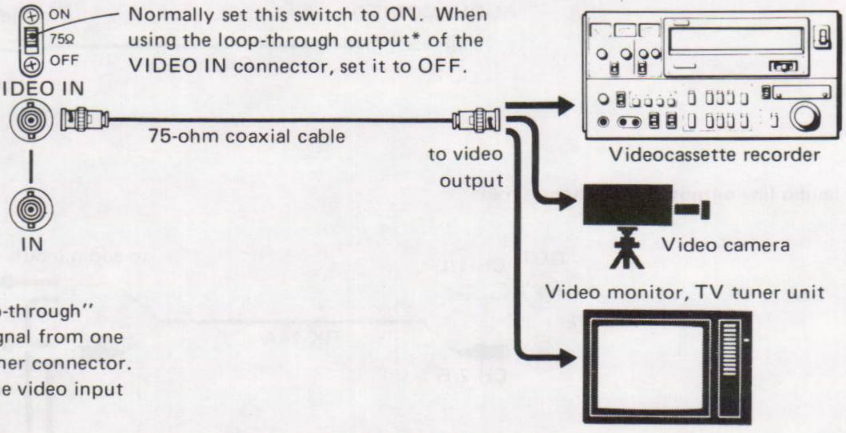
B & W: For a black and white monitor.

REMOTE connector (33-pin)


Match the triangles to each other
REMOTE
(33-pin)
RCC-5F Remote
Control Cable
male
white button
female
to 33-pin
connector
RM-440 Editing Control Unit
(20-pin)
white button
Match the triangles
to each other
RX-353 or RX-303
Auto Search Control

- The REMOTE connector accepts a 20-pin connector. A plug adaptor is unnecessary.

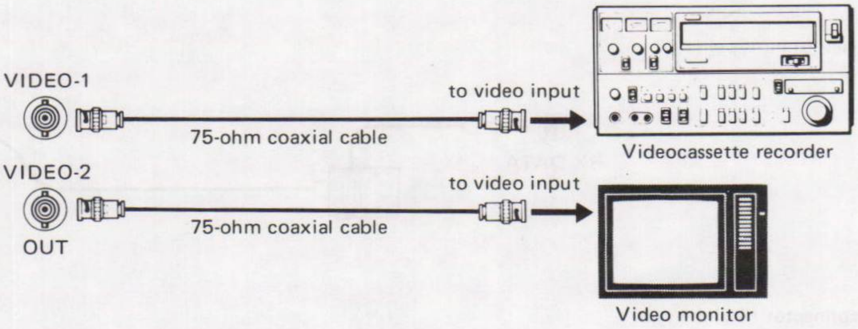
VIDEO IN connectors (BNC type) **and 75-ohm termination switch**


ON
75Ω
OFF
VIDEO IN
IN
75-ohm coaxial cable
to video output
Videocassette recorder
Video camera
Video monitor, TV tuner unit

Normally set this switch to ON. When using the loop-through output* of the VIDEO IN connector, set it to OFF.

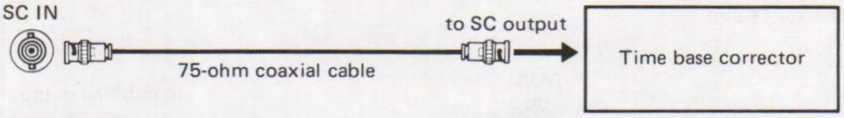
* These two connectors are in "loop-through" configuration, so that the input signal from one connector is fed directly to the other connector. Use this loop-through output as the video input source for other video equipment.

VIDEO OUT connectors (BNC type)

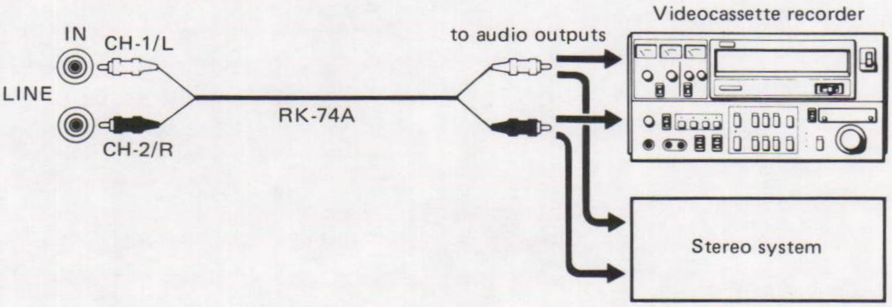

VIDEO-1
to video input
75-ohm coaxial cable
Videocassette recorder
VIDEO-2
to video input
75-ohm coaxial cable
OUT
Video monitor

COLOR LOCK switch
As a rule, set to NORMAL. If the playback picture has no color or if the hue is abnormal set the switch to the position marked [•].

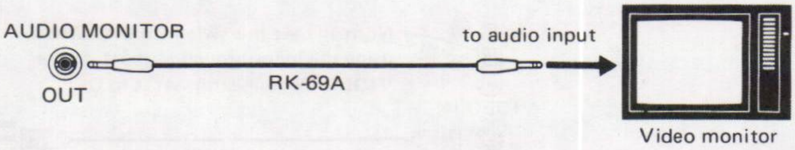
SC IN (subcarrier input) connector (BNC type)


SC IN
to SC output
75-ohm coaxial cable
Time base corrector

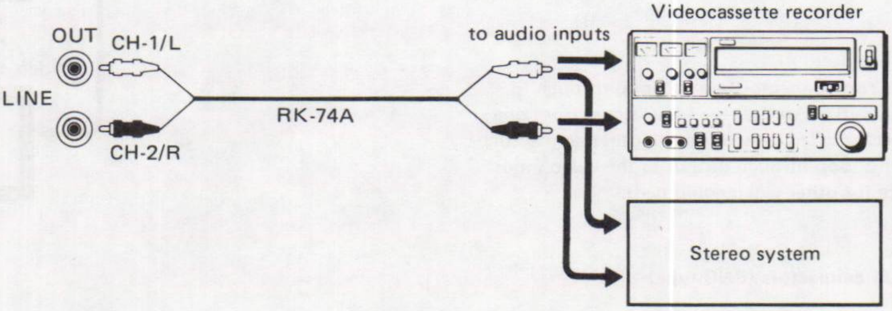
LINE IN (audio line input) jacks (phono type)


Videocassette recorder
IN
CH-1/L
to audio outputs
LINE
RK-74A
CH-2/R
Stereo system

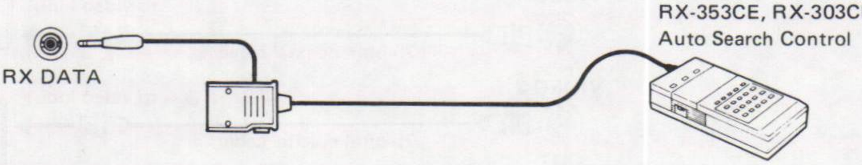
AUDIO MONITOR jack (mini type)


AUDIO MONITOR
OUT
RK-69A
to audio input
Video monitor

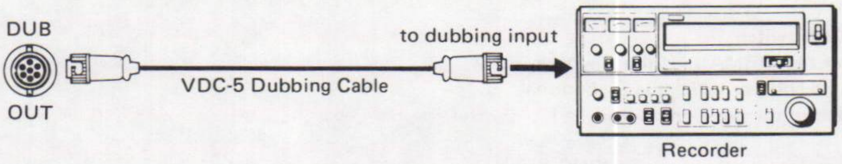
LINE OUT (audio line output) jacks (phono type)


OUT
CH-1/L
LINE
CH-2/R
RK-74A
to audio inputs
Videocassette recorder
Stereo system

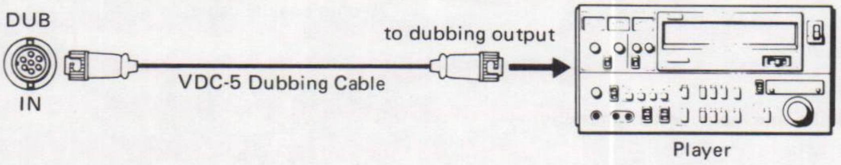
RX DATA jack (mini type)


RX DATA
RX-353CE, RX-303CE
Auto Search Control

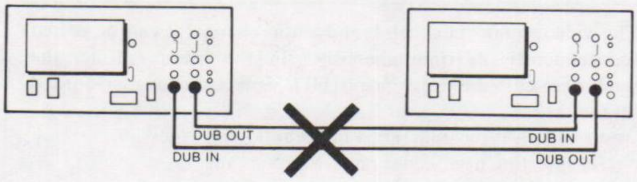
DUB OUT connector (7 pin)

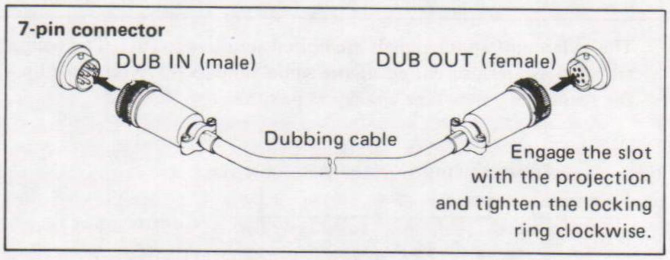

DUB
OUT
VDC-5 Dubbing Cable
to dubbing input
Recorder

DUB IN connector (7 pin)


DUB
IN
VDC-5 Dubbing Cable
to dubbing output
Player

NOTE:
Do not connect the dubbing connectors in parallel.

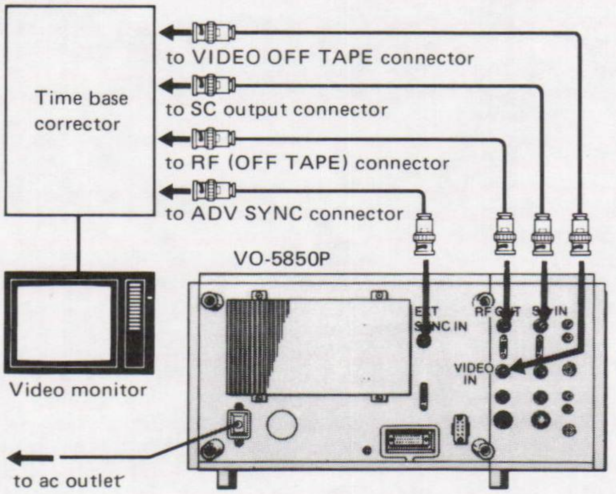

DUB OUT
DUB IN
DUB IN
DUB OUT


7-pin connector
DUB IN (male)
DUB OUT (female)
Dubbing cable
Engage the slot with the projection and tighten the locking ring clockwise.

COLOR FRAMING switch
Normally set the switch to ON, and the color framing system functions during editing. At the ON position, the preroll time will be 10 seconds.
At the OFF position, the color framing system does not function, but the preroll time will be shortened to 5 seconds.

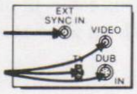
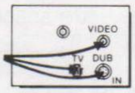
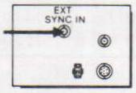
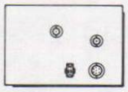
USING A TIME BASE CORRECTOR

The best possible playback picture can be obtained when a time base corrector is used. Connect the time base corrector as illustrated below, and set the MODE SELECT switch to TBC.


Time base corrector
to VIDEO OFF TAPE connector
to SC output connector
to RF (OFF TAPE) connector
to ADV SYNC connector
VO-5850P
EXT SYNC IN
RF OUT
SC IN
VIDEO IN
Video monitor
to ac outlet

SYNC SYSTEM

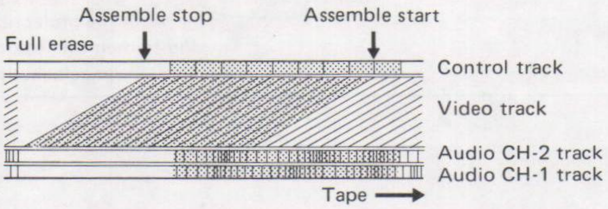
The VO-5850P can operate with the internal sync system when no external signal is input, or with the external sync system when an external signal is input. The reference signal is changed depending upon the setting of the MODE SELECT switch and the input signals.

External signals	Recording	Playback
Sync signal Video signal 	Sync with the video signal	MODE SELECT TBC, NORMAL: Sync with the sync signal EDIT: Sync with the video signal
Video signal 	Sync with the video signal	
Sync signal 	Sync with the sync signal	
No input signal 	Sync with the signal generated by the built-in sync generator	

1-5. AUTOMATIC ELECTRONIC EDITING

ASSEMBLY EDITING

The video and audio signals are edited simultaneously. The control signals are also edited at the same time so that you can edit the scenes on a new tape as easy as possible.


Assemble stop
Assemble start
Full erase
Control track
Video track
Audio CH-2 track
Audio CH-1 track
Tape

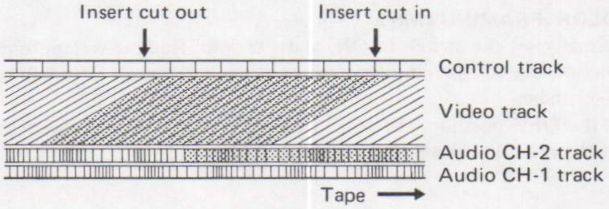
NOTE:
Because at the cut-out point the erased portion is triangular, the picture will be unstable at that point when assembly editing is used to add a new scene to the recorded tape.

INSERT EDITING

The video, audio channel 1 and audio channel 2 can be edited independently or simultaneously. In the insert editing, the signals are edited in reference to CTL signals previously recorded on the tape.

Insert editing is recommended in the following cases:

- for inserting new scenes on a recorded tape.
- for adding the sound effects or commentary onto a tape which already has the video signals recorded on it.
- for adding video signals onto a tape which already audio signals recorded on it.

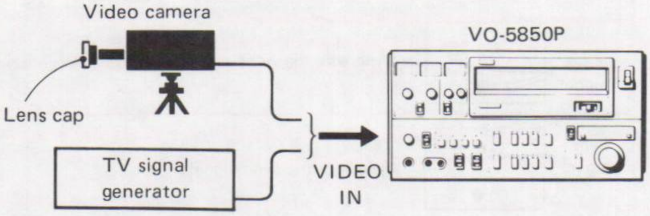

Insert cut out
Insert cut in
Control track
Video track
Audio CH-2 track
Audio CH-1 track
Tape

NOTE:
Continuous CTL signals must be recorded before insert editing.

How to Record the CTL Signals

CTL signals are usually recorded together with the video signals. However CTL signals can be recorded by themselves in the following ways:

- Record the signals from a camera whose lens cap is in place, or
- Record the black burst signal from a TV signal generator.

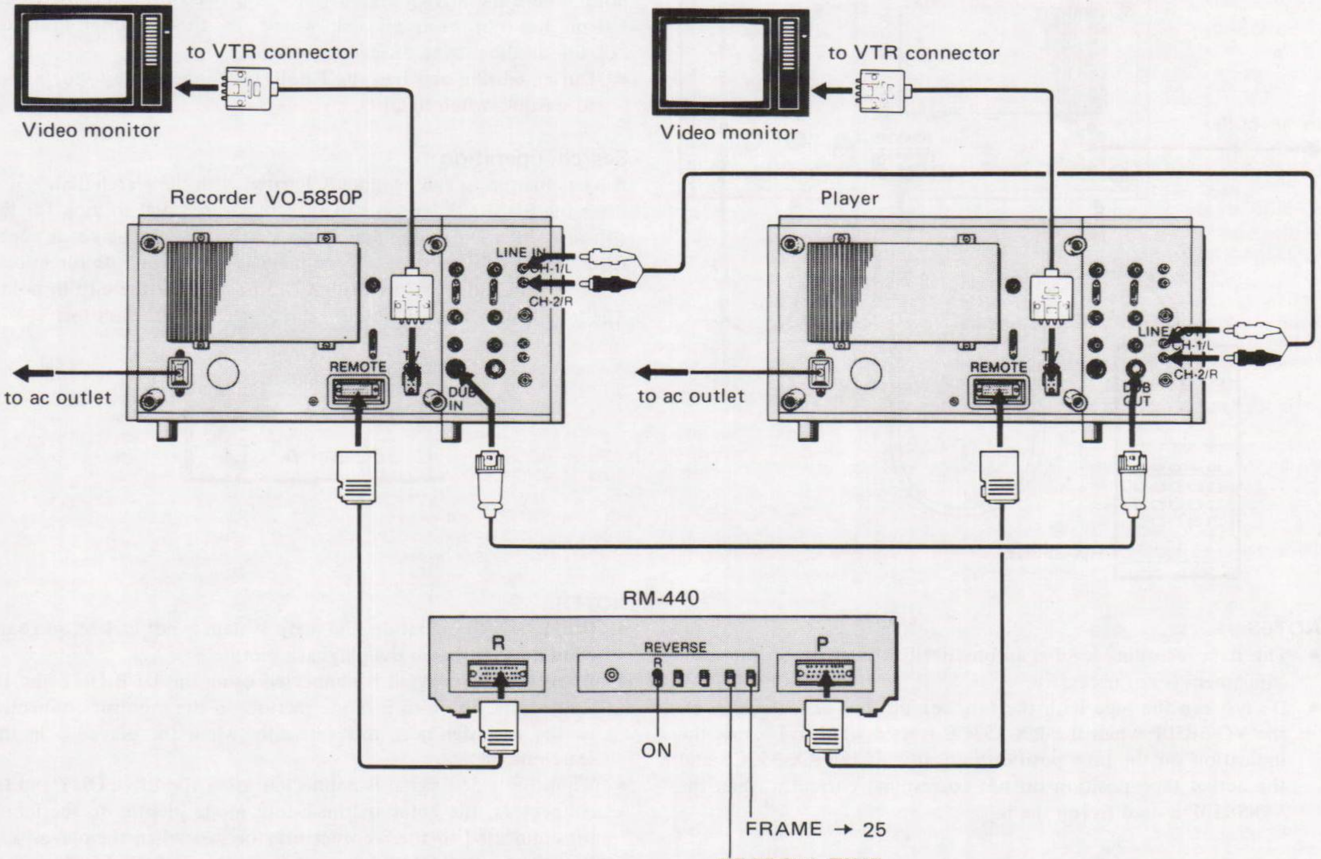

Video camera
Lens cap
TV signal generator
VO-5850P
VIDEO IN

When the RM-440 Automatic Editing Control Unit is used with the VO-5850P, accurate and automatic tape-to-tape editing is possible. Once the edit-in and edit-out points have been memorized on the RM-440, the editing can be done simply by pressing the AUTO EDIT button.

Almost all functions of the RM-440 can be activated when the RM-440 is used with the VO-5850P. However, picture search is possible only when a KCS cassette is used.

- During picture search, the picture may become monochrome or roll vertically on some monitors. If this happens, release the picture search mode by turning the search dial.

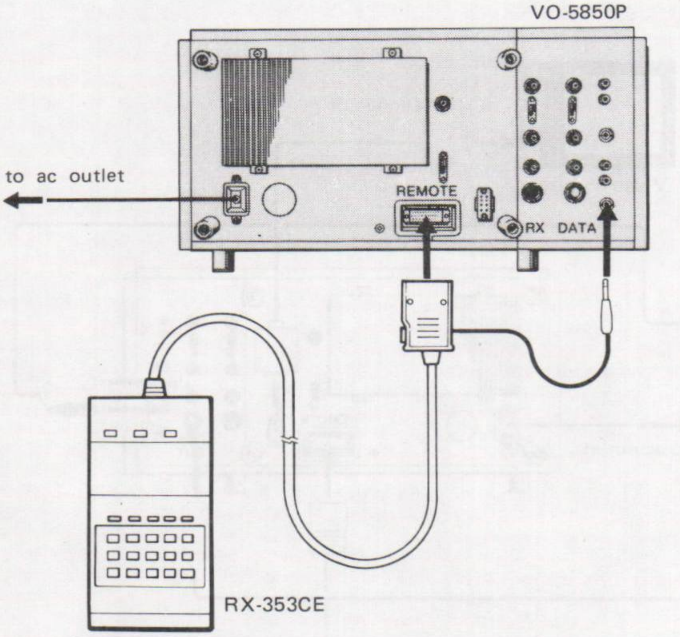
Editing Connections


to VTR connector
Video monitor
to VTR connector
Video monitor
Recorder VO-5850P
Player
LINE IN
CH-1/L
CH-2/R
REMOTE
TV
DUB IN
to ac outlet
to ac outlet
LINE OUT
CH-1/L
CH-2/R
REMOTE
TV
DUB OUT
RM-440
R
REVERSE
R
P
ON
FRAME → 25

PREROLL TIME
When the COLOR FRAMING switch is set to ON → L
When the COLOR FRAMING switch is set to OFF → S

1-6. AUTO SEARCH CONTROL

The RX-353CE devides the recorded material into segments. A segment has its own number and the beginning and end position on the tape, and we call them the segment data. The segment data can be recorded at the beginning of the audio channel 1 on the tape, and be kept even if the RX-353CE is disconnected or the power of the recorder is turned off. So the data can be used repeatedly.



NOTES:

- The data recording level is automatically adjusted. So the level adjustment is not necessary.
- Do not run the tape with the function buttons or search dial on the VO-5850P when the RX-353CE is used. This is because the indication on the tape position indicator of the RX-353CE and the actual tape position do not correspond correctly when the VO-5850P is used to run the tape.

1-7. NOTE ON MODE

Search dial

After pressing the SEARCH button, turn this dial to control the speed and direction of tape travel during the search for a particular point on the tape. You can vary the tape speed from 1/30 to 5 times normal playback speed. When the dial is set at the center "0" position, the picture will be still.

- When this dial is used, the servo system is not locked so the guard band noise flows on the playback picture.

SEARCH button

Press to engage the search dial.

RESET button

Press to reset the time counter to "00 minutes 00 seconds". The point memorized by the MARK IN button will be cancelled.

Time counter

This counter counts the CTL signals on the tape during playback, and the CTL signals begin recorded during recording and indicates the tape running time at the normal playback speed in minutes and seconds (up to 99 minutes 59 seconds).

MARK IN button

Press to memorize a particular point on the tape.

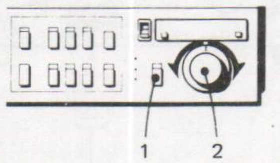
MEMORY switch

When this switch is set to ON, the tape will automatically stop the point where the MARK IN button was pressed or, if the MARK IN button has not been pressed, where the time counter indicates "00 00" in the rewind or search mode.

- During editing or when the REMOTE connector is used, be sure to set this switch to OFF.

Search operation

A particular point can be quickly located with the search dial.
Press the SEARCH button and turn the search dial to look for the edit-in point. The search dial allows you to vary the playback speed from 1/30 to 5 times the normal playback speed in both directions. Set the search dial to the center "0" position at the edit-in point. The tape stops and a still picture can be seen on the monitor.



NOTES:

- During search operation, the servo system is not locked, so guard band noise flows on the playback picture.
- When the video signal is connected using the DUB OUT and IN connectors, the E-to-E mode picture on the monitor connected to the recorder may roll vertically when the player is in the search mode.
- When the video signal is connected using the LINE OUT and IN connectors, the color of the E-to-E mode picture on the monitor connected to the recorder may be lost when the player is in the search mode. If this happens, set the COLOR LOCK switch to a different position.
- If the MODE SELECT switch is set to TBC but a time base corrector is not connected, the vertical sync does not lock and the picture rolls vertically.

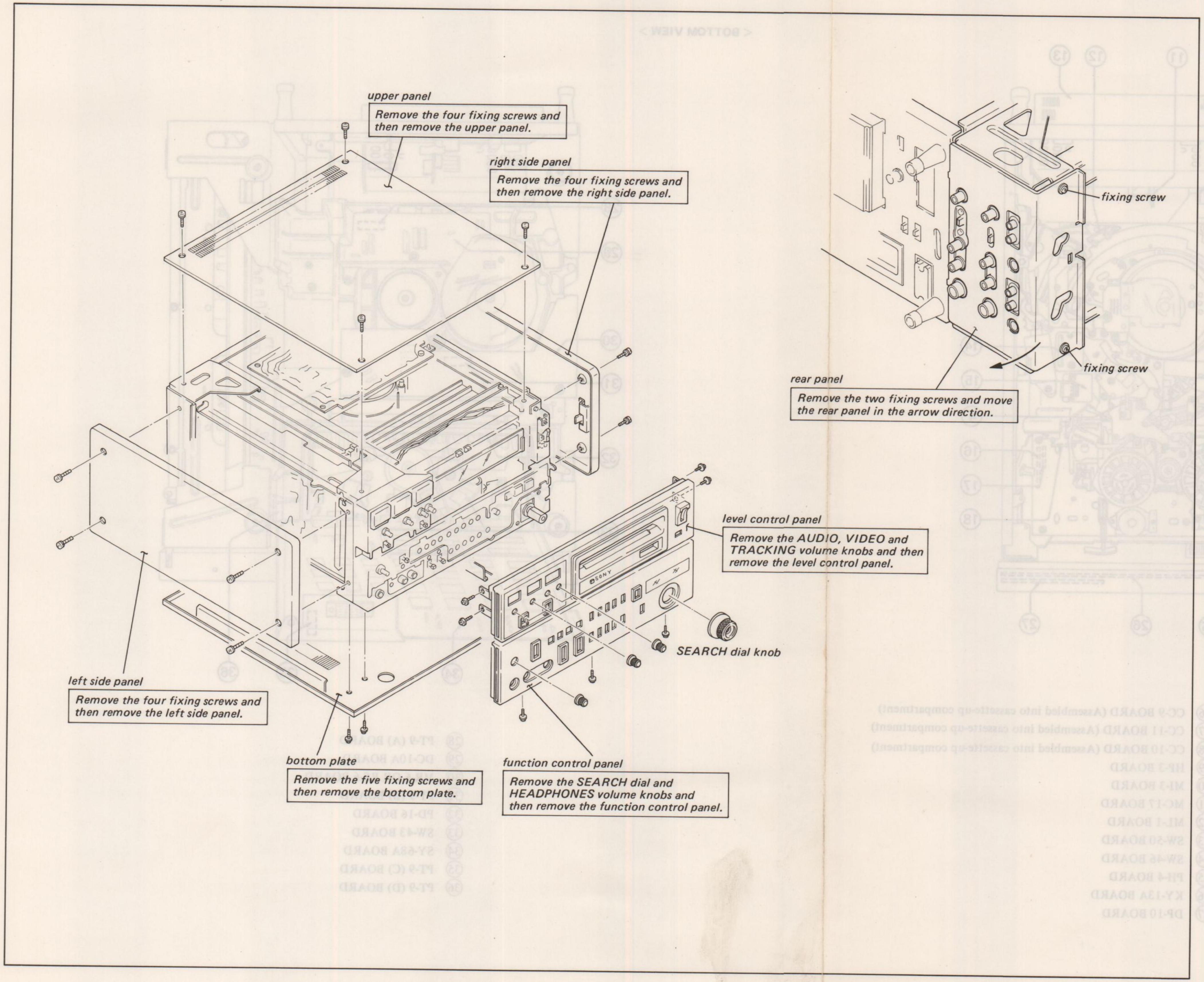
The long pause mode

If the pause mode continues for more than 8 minutes, the tape around the head drum automatically slackens to protect the video head and the tape.
This is called the long pause mode.

If the STAND BY indicator remains lit and any of function buttons (except for the EJECT button) does not operate the recorder.
Eject the cassette and take up the leader tape manually by turning the reel to the direction of the arrow on the bottom until the leader tape is completely taken up.
Insert the cassette again.

SECTION 2
SERVICE INFORMATION

2-1. DISASSEMBLY OF CABINET


upper panel
Remove the four fixing screws and then remove the upper panel.
right side panel
Remove the four fixing screws and then remove the right side panel.
fixing screw
fixing screw
rear panel
Remove the two fixing screws and move the rear panel in the arrow direction.
level control panel
Remove the AUDIO, VIDEO and TRACKING volume knobs and then remove the level control panel.
SEARCH dial knob
left side panel
Remove the four fixing screws and then remove the left side panel.
bottom plate
Remove the five fixing screws and then remove the bottom plate.
function control panel
Remove the SEARCH dial and HEADPHONES volume knobs and then remove the function control panel.

2-2. CASSETTE-UP COMPARTMENT REMOVAL AND INSTALLING PROCEDURES

(1) Remove the upper panel and right side ornamental panel.

(2) Disconnect the connector of cassette-up compartment.

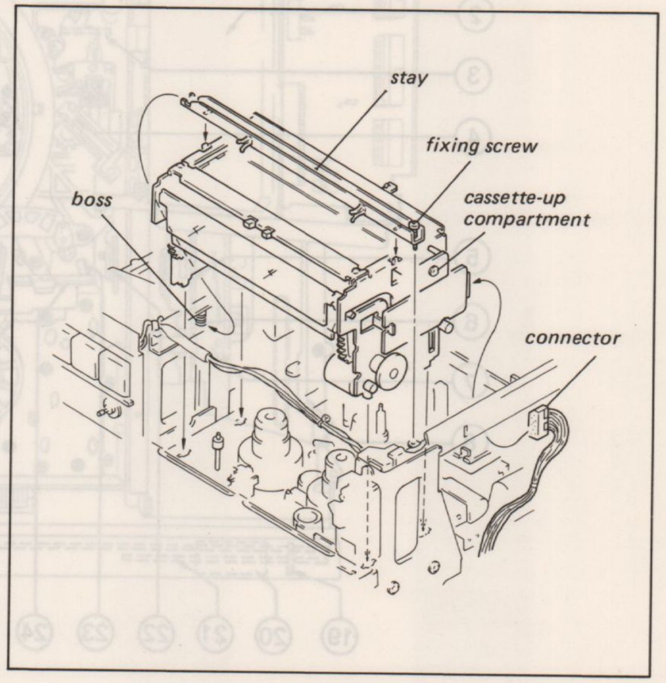
(3) Disconnect the harness from the stay.

(4) Loosen the fixing screw of the right-end of stay.

(5) Remove the stay from boss of side panel.

(6) Remove the cassette-up compartment.

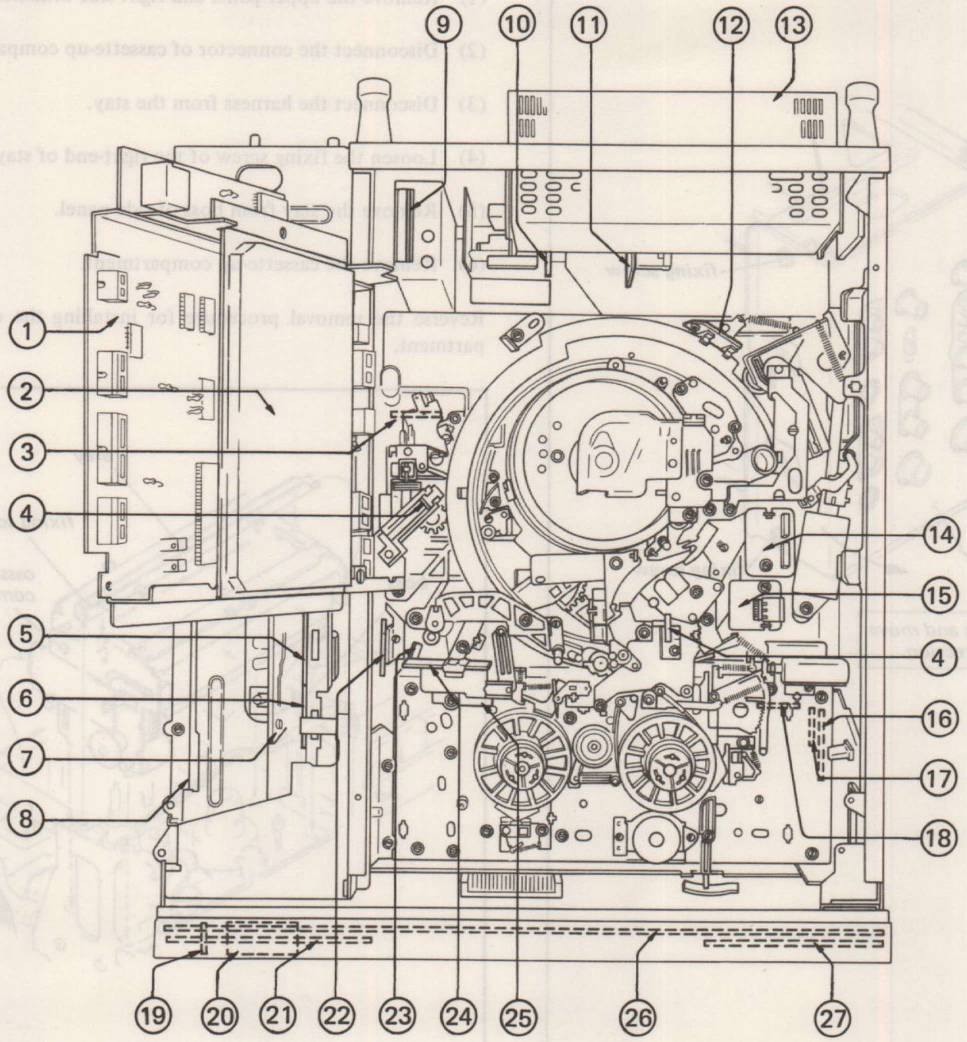
Reverse the removal procedure for installing the cassette-up compartment.


stay
fixing screw
boss
cassette-up compartment
connector

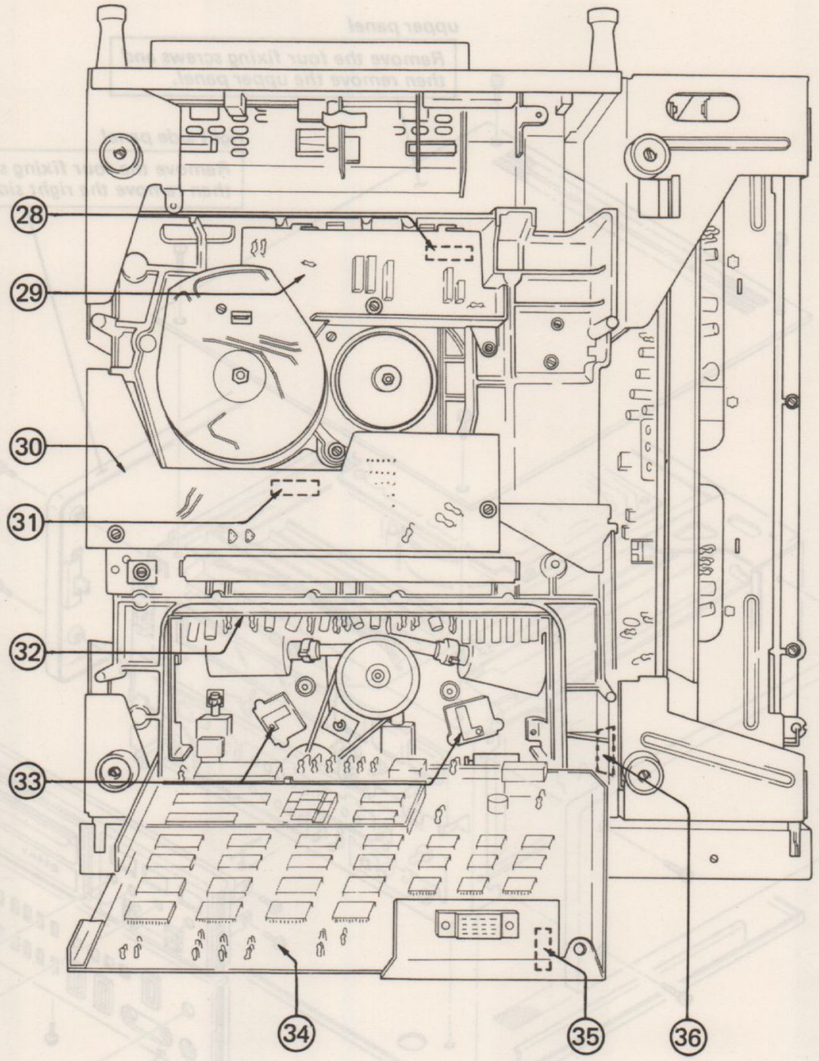
2-3. MAIN PARTS LOCATION

2-3-1. Location of the Printed Circuit Boards

< TOP VIEW >



< BOTTOM VIEW >

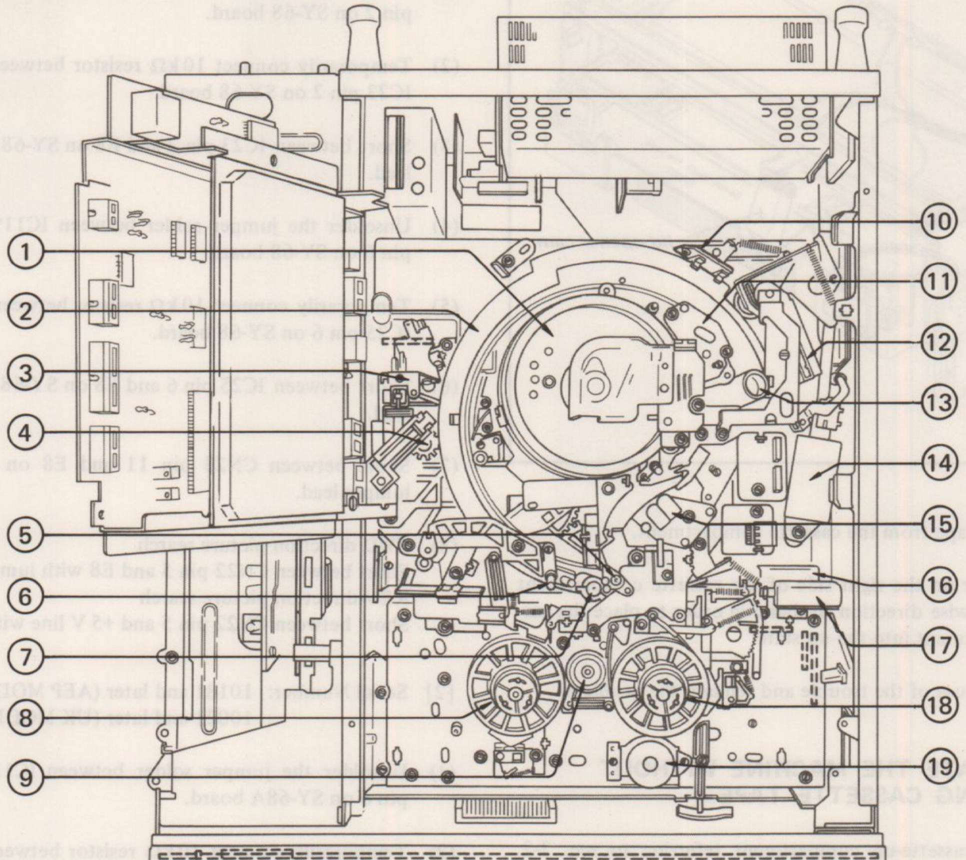


① SV-31A BOARD
② CF-7 BOARD or CF-10 BOARD
③ LM-7 BOARD
④ PH-5 BOARD
⑤ MP-12A BOARD (with CB-6 board)
⑥ BS-3 BOARD
⑦ DM-22A BOARD (with DL-2 board)
⑧ AU-21 BOARD
⑨ RE-5 BOARD
⑩ AC-27 BOARD
⑪ AC-36 BOARD or AC-35 BOARD
⑫ FR-11 BOARD
⑬ UR-02 (switching regulator)
⑭ AH-3 BOARD
⑮ EC-19 BOARD
⑯ CC-9 BOARD (Assembled into cassette-up compartment)
⑰ CC-11 BOARD (Assembled into cassette-up compartment)
⑱ CC-10 BOARD (Assembled into cassette-up compartment)
⑲ HP-3 BOARD
⑳ MI-3 BOARD
㉑ MC-17 BOARD
㉒ ML-1 BOARD
㉓ SW-50 BOARD
㉔ SW-46 BOARD
㉕ PH-4 BOARD
㉖ KY-13A BOARD
㉗ DP-10 BOARD

㉘ PT-9 (A) BOARD
㉙ DC-10A BOARD
㉚ MR-6 OR RS-6 BOARD
㉛ PT-9 (B) BOARD
㉜ PD-16 BOARD
㉝ SW-43 BOARD
㉞ SY-68A BOARD
㉟ PT-9 (C) BOARD
㊱ PT-9 (D) BOARD

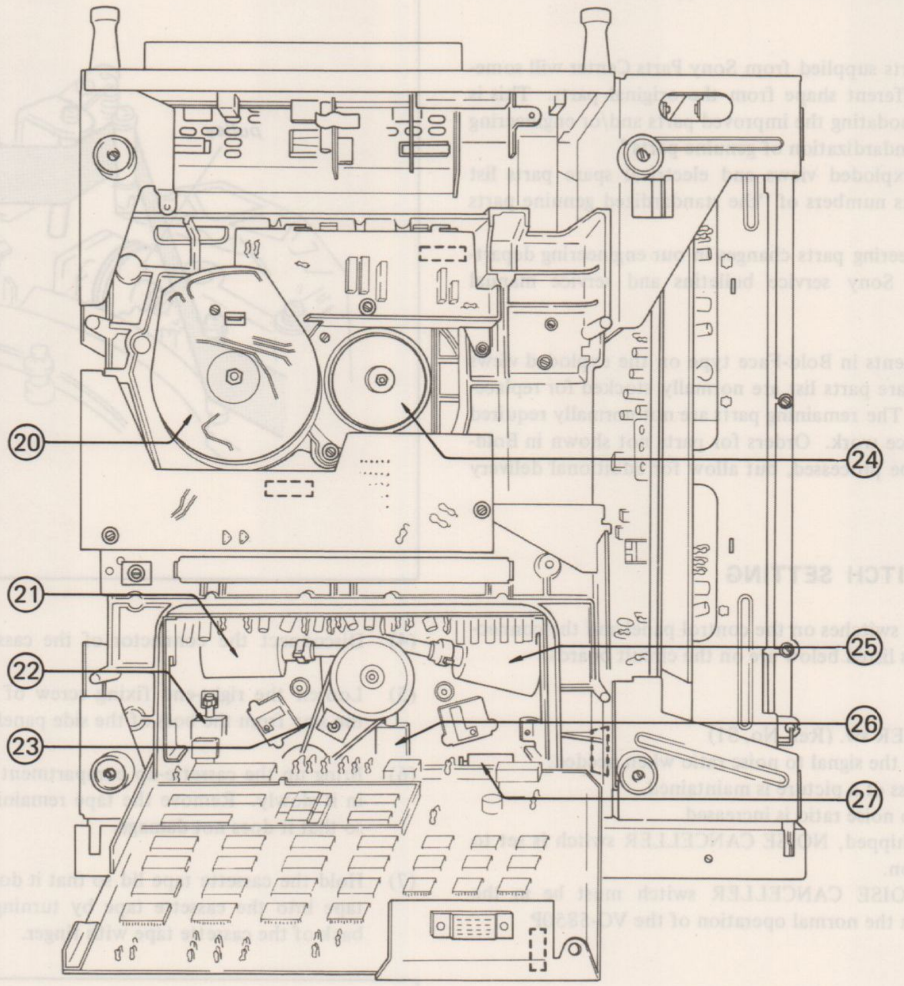
2-3-2. Location of the Mechanical Main Parts/Components

< TOP VIEW >



①	Head drum
②	Threading ring
③	T correction guide
④	Gear box
⑤	S drawer arm
⑥	T drawer arm
⑦	Pinch roller
⑧	Take-up reel table
⑨	FF/REW idler
⑩	FR detector
⑪	Audio/CTL head
⑫	Pinch lever
⑬	Capstan shaft
⑭	Pinch solenoid
⑮	CTL/Erase head
⑯	Search solenoid
⑰	Skew solenoid
⑱	Supply reel table
⑲	Reel motor

< BOTTOM VIEW >



⑳	Capstan motor
㉑	Supply idler solenoid
㉒	Supply brake solenoid
㉓	Belt for FF/REW idler
㉔	Drum motor
㉕	Take-up idler solenoid
㉖	10 times picture search solenoid
㉗	Take-up brake solenoid

2-4. SPARE PARTS

1. Safety Related Components Warning.
   Components identified by shading marked with ⚠ on the schematic diagrams, exploded views and electrical spare parts list are critical to safe operation. Replace these components with Sony parts whose part numbers appear in this manual or in service bulletins and service manual supplements published by Sony.

2. Replacement Parts supplied from Sony Parts Center will sometimes have a different shape from the original parts. This is due to "accommodating the improved parts and/or engineering changes" or "standardization of genuine parts".
   This manual's exploded views and electrical spare parts list indicate the parts numbers of "the standardized genuine parts at present".
   Regarding engineering parts changes in our engineering department, refer to Sony service bulletins and service manual supplements.

3. Printed Components in Bold-Face type on the exploded views and electrical spare parts list are normally stocked for replacement purposes. The remaining parts are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

2-5. SELECT SWITCH SETTING

Along with the select switches on the control panel and the connector panel, the switches listed below are on the circuit boards.

- DM-22A board
  NOISE CANCELLER sw. (Ref. No. S1)
  In used to increase the signal to noise ratio when needed.
  SHARP: Sharpness of a picture is maintained.
  SOFT: Signal to noise ratio is increased.
  When the set is shipped, NOISE CANCELLER switch is set to the SHARP position.
  Note that the NOISE CANCELLER switch must be in the SHARP position in the normal operation of the VO-5850P

- MP-12A board
  MINOR PRE-EMPHASIS sw. (Ref. No. S1)
  VO-5850P has the Y-HIGH FREQUENCY PRE-EMPHASIS circuit in modulator system circuit. VO-2850P, does not have this circuit. Therefore, when the tape-to-tape editing is performed with VO-5850P and VO-2850P, it is recommended to this switch is set to OFF position.
  When the set is shipped, MINOR PRE-EMPHASIS switch is set to ON position.

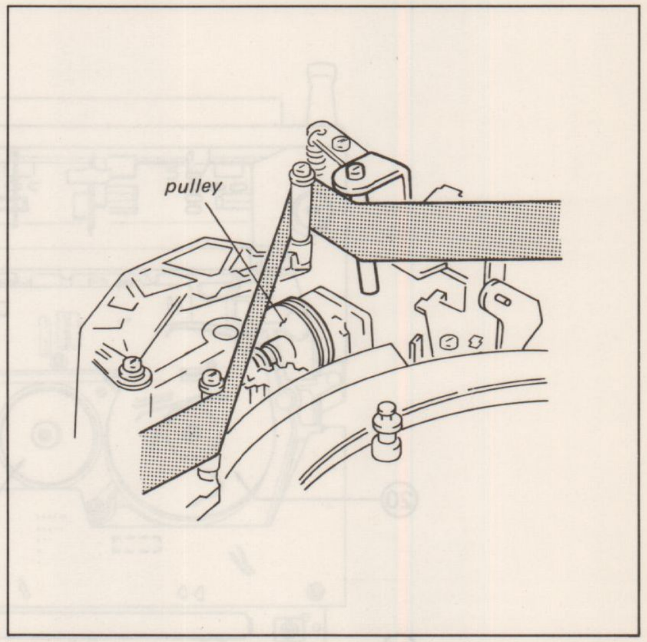
2-6. CASSETTE REMOVAL PROCEDURE WHEN NORMAL EJECTION IS NOT POSSIBLE

If the eject operation becomes impossible due to trouble or the cassette-up compartment does not rise when the eject operation takes place, the cassette tape can be removed from the set by the procedures described below.

(1) Turn off the POWER.

(2) Remove the upper panel and right side ornamental panel.

(3) Turn the white colored pulley of the gear box in the clockwise direction with finger until the threading ring places into the FR-STOP position.
(The threading ring moves in the unthreading direction. But the tape remains at the position of threading completion.)

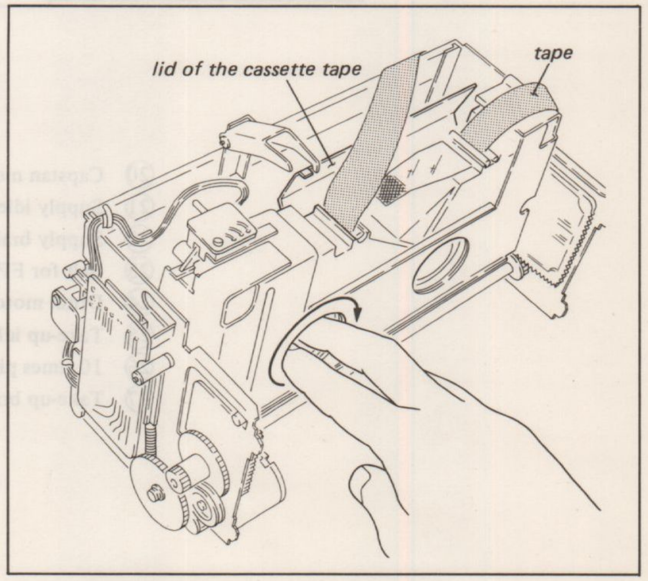


(4) Disconnect the connector of the cassette-up compartment.

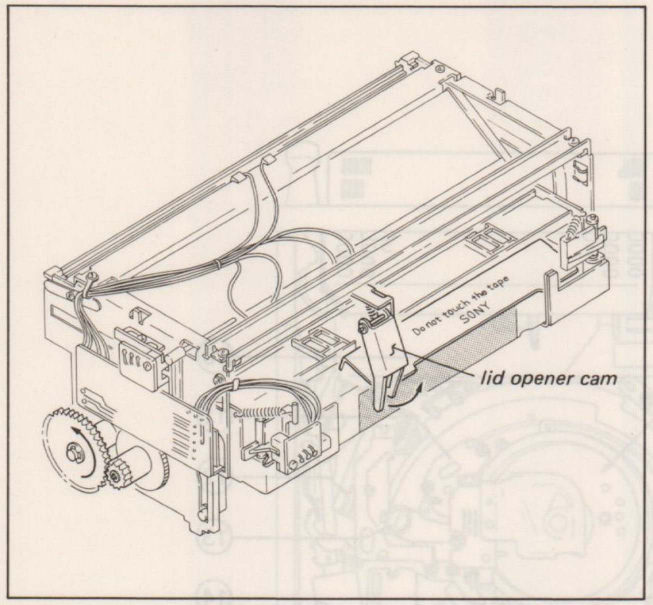
(5) Loosen the right-end fixing screw of the stay, and remove the stay from the boss of the side panel.

(6) Bring up the cassette-up compartment with the cassette tape in it slowly. Remove the tape remaining in the set carefully so that it does not damage.

(7) Hold the cassette tape lid so that it does not close. Wind the tape into the cassette tape by turning the reel hub on the back of the cassette tape with finger.



(8) Raise the cam for opening the lid and close the cassette tape lid.



(9) Remove the tape from the cassette compartment.

(10) Turn the gear on the right side of the cassette compartment counterclockwise direction by hand in order to place the cassette compartment into the up state.

(11) Locate the cause of the trouble and remedy the problem.

2-7. TO OPERATE THE MACHINE WITHOUT INSTALLING CASSETTE TAPE

(1) Remove the cassette-up compartment referring to sec. 2-2. (Tape beginning sensor and tape end sensor are disabled according to disconnect the connector of cassette-up compartment.)

(2) Turn off the POWER. (The machine is put into the FR-STOP mode automatically.)

(3) The machine can be placed into the desired mode by pressing the function button to corresponding to the mode.

2-8. TO SET UP 10 TIMES PICTURE SEARCH MODE WITHOUT RM-440

- Search picture at 1/30 to 5 times normal speed can be obtained in both forward and reverse directions by the SEARCH dial on the function control panel. When the KCS cassette is inserted into VTR and the RM-440 is connected to VTR, 10 times picture search is also obtained with the SEARCH dial on the RM-440.

- If RM-440 is not available, 10 times picture search mode is set up as the following procedures.

[1] Serial Number: up to 10180 (AEP MODEL).
: up to 10020 (UK MODEL).

(1) Unsolder the jumper solder between IC101 pin 4 and IC23 pin 2 on SY-68 board.

(2) Temporarily connect 10 kΩ resistor between IC101 pin 4 and IC23 pin 2 on SY-68 board.

(3) Short between IC23 pin 2 and E8 on SY-68 board with jumper lead.

(4) Unsolder the jumper solder between IC119 pin 10 and IC25 pin 6 on SY-68 board.

(5) Temporarily connect 10 kΩ resistor between IC119 pin 10 and IC25 pin 6 on SY-68 board.

(6) Short between IC25 pin 6 and E8 on SY-68 board with jumper lead.

(7) Short between CN23 pin 11 and E8 on SY-68 board with jumper lead.

(8) FWD direction picture search
Short between CN22 pin 5 and E8 with jumper lead.
REV direction picture search
Short between CN22 pin 5 and +5 V line with jumper lead.

[2] Serial Number: 10181 and later (AEP MODEL)
: 10021 and later (UK MODEL)

(1) Unsolder the jumper solder between IC136 pin 4 and IC33 pin 6 on SY-68A board.

(2) Temporarily connect 10 kΩ resistor between IC136 pin 4 and IC33 pin 6 on SY-68A board.

(3) Short between IC33 pin 6 and E8 on SY-68A board with jumper lead.

(4) Unsolder the jumper solder between IC134 pin 3 and IC32 pin 4 on SY-68A board.

(5) Temporarily connect 10 kΩ resistor between IC134 pin 3 and IC32 pin 4 on SY-68A board.

(6) Short between IC32 pin 4 and E8 on SY-68A board with jumper lead.

(7) Short between CN23 pin 11 and E8 on SY-68A board with jumper lead.

(8) FWD direction picture search
Short between CN22 pin 5 and +5 V line with jumper lead.
REV direction picture search
Short between CN22 pin 5 and E8 with jumper lead.

After check and/or adjustment is performed, the reset circuit is made to original.

2-9. TAPE SLACK DETECTOR

If the tape is not taken up and tape slack is occurred in the machine, these conditions are detected with the reel rotation detector under the reel table. The reel rotation detector is composed with the slit of the reel table and the photointerrupter. If the reel table is stopped its rotation more than the listed time in FWD, REV and unthreading modes, the reel rotation detector circuit detect as the tape slackes in the machine, and generates the auto stop signal.

Mode	Time
x1 speed ~	0.3 sec.
x1/10 ~ x1 speed	1.6 sec.
~ 1/10 speed	9.6 sec.

2-10. STOP (E-to-E) MODE

When the cassette tape that the red button is placed on the bottom is inserted into the VTR, the E-to-E picture is obtained on the monitor screen in the FR-STOP mode. The E-to-E picture is also obtained in the EJECT completion (cassette-up) mode.
If you want to set up into the STOP (E-to-E) mode in electrical adjustment, perform the above-mentioned step.

NOTE: Do not use the alignment tape to set up the STOP (E-to-E) mode.

2-11. FIXTURE

Description	**Part Number**
Drum Eccentricity Gauge (3)	J-6001-820-A
Drum Eccentricity Gauge (2)	J-6001-830-A
Drum Eccentricity Gauge (1)	J-6001-840-A
Drum Eccentricity Gauge (4)	J-6001-930-A
Dihedral Adjusting Screw	J-6002-290-A
Flatness Plate	J-6009-830-A
Reel Table Height Check Base Jig	J-6130-010-A
Reel Table Height Check Jig	J-6130-020-A
Pinch Lever Adjustment Jig	J-6150-020-A
Cleaning Fluid	Y-2031-001-0
Cleaning Piece	2-034-697-00
Torque Measurement Tape (100 mm dia.)	3-702-215-01
Back Tension Adjustment Jig	3-702-216-01
Sony Oil	7-661-018-01
Tension Scale (50 g full scale)	7-732-050-20
Tension Scale (100 g full scale)	7-732-050-30
Tension Scale (200 g full scale)	7-732-050-40
Tension Scale (500 g full scale)	7-732-050-50
Alignment Tape, RR5-2SA-PAL	8-960-015-63
Thickness Gauge	9-911-053-00
Head Demagnetizer, HE-4	Standard products.

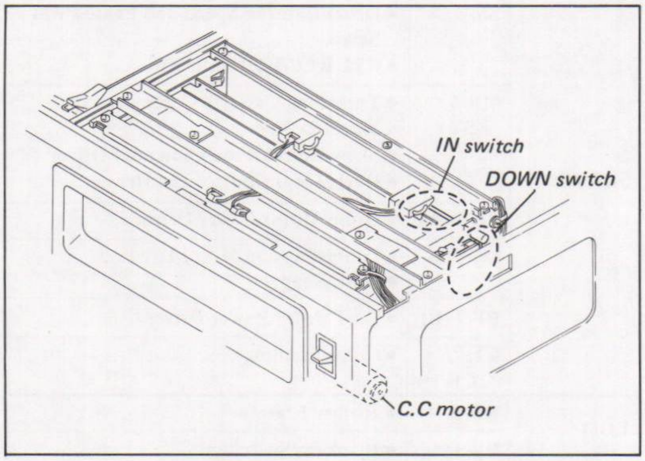
2-12. PRINTED CIRCUIT BOARD

The circuit board information is provided below.

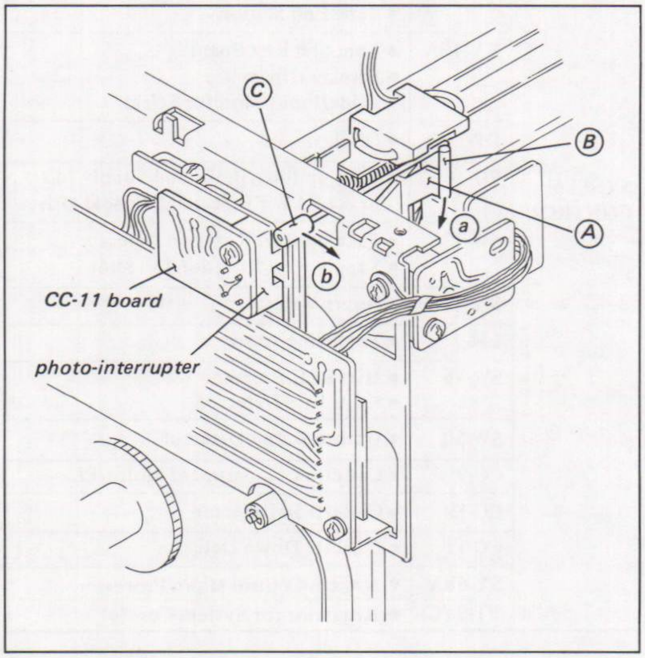
SYSTEM	BOARD	CIRCUIT FUNCTION
VIDEO	MP-12A	• Luminance and Chrominance Signal Modulator • REC/PB Amplifier
	PT-9 (D)	• Video System Protection
	CB-6	• Video Input Connector Board
	DM-22A	• Luminance and Chrominance Signal Demodulator
	DL-2	• 1H Delay
	CL-4	• Color Lock Switch
AUDIO	AU-21	• Audio REC/PB Amplifier • Bias/Erase Oscillator
	MI-3	• CH-1/CH-2 Mic Input
	HP-3	• Headphones Level Control/Headphones Jack
	EC-19	• Full Erase/CTL PB Head
	AH-3	• Audio REC/PB/Erase and CTL REC/PB Head
	MC-17	• Audio/Tracking Meter and Level Control
SERVO	SV-31A	• Drum/Capstan Speed and Phase PWM Servo • CTL REC/PB Amplifier
	MR-6 (RS-6)	• Threading/Cassette Compartment Motor Driver • Skew/Search/Pinch Solenoid Driver • Reel Motor Control and Driver
	PT-9 (A)	• Drum Motor Power Driver
	DC-10A	• Drum/Capstan Motor Driver • DME Shaper
	PT-9 (B)	• Reel Motor Power Driver
	CF-7/ CF-10	• Color Framing
EDIT	RE-5	• Rotary Erase
	BS-3	• Blanking Switcher
POWER SUPPLY	AC-35	• AC Input/Line Filter
	AC-27	• AC Input
	AC-36	• Line Filter
	UR-02	• Switching Regulator
	DC-10A	• Power Supply
SYSTEM CONTROL	FR-11	• Threading Ring Mechanical Position Detector
	PH-4 PH-5	• Tape Tension Detector • Tape Beginning Sensor • Tape End Sensor
	KY-13A	• Function Key Board • Display Driver • Mode/Input/Monitor Select
	DP-10	• Display
	PD-16	• Take up Idler/Brake and Supply Idler/Brake REW FF Search Solenoid Driver
	SW-43	• Take up Reel Rotation Detector • Supply Reel Rotation Detector
	ML-1	• Hours Meter
	LM-7	• Threading Motor
	SW-46	• Miss REC Detector • KCA/KCS Detector
	SW-50	• Unthread End Detector
	CC-9	• Cassette Compartment Motor/PL
	CC-10	• Cassette in Detector
	CC-11	• Cassette Down Detector
	SY-68A	• System Control Micro Processor
	PT-9 (C)	• Regulator for System Control

2-13. CASSETTE-UP COMPARTMENT OPERATION

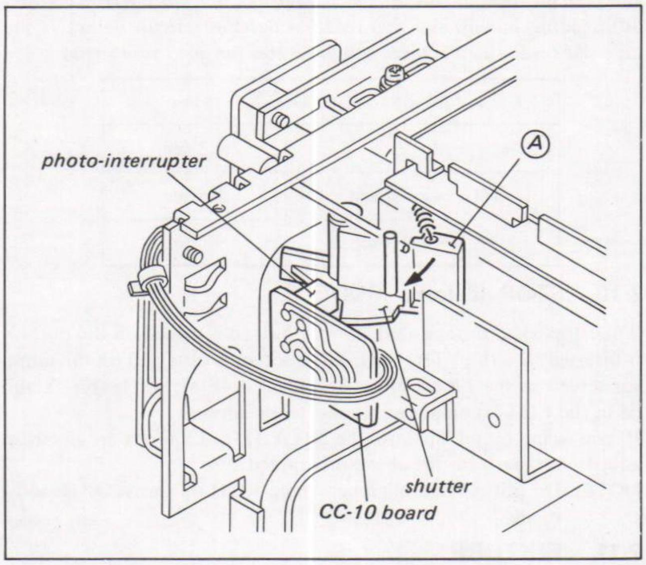
The cassette insertion system in the VO-5850P is a front access system. The cassette compartment drops automatically after the cassette tape has been inserted into the cassette compartment and threading action is started after the cassette is seated in the home position.
The timing of the electronic switches and motor are referring sec. 2-15.
The cassette down switch, cassette in switch and cassette compartment motor operates as follows:



(1) Cassette Down Switch
The cassette tape is inserted by hand and then the cassette pushing lever (called Ⓐ for making the sentence simple) moves in the direction indicated by arrow ⓐ.
The down switch arm (called ⓒ) which has been held by the pin (called Ⓑ) of the Ⓐ moves in the direction shown by arrow ⓑ with the movement of Ⓐ, and the shutter of ⓒ opens the photo-interrupter on the CC-11 board.
Then the DOWN switch turns to "L".

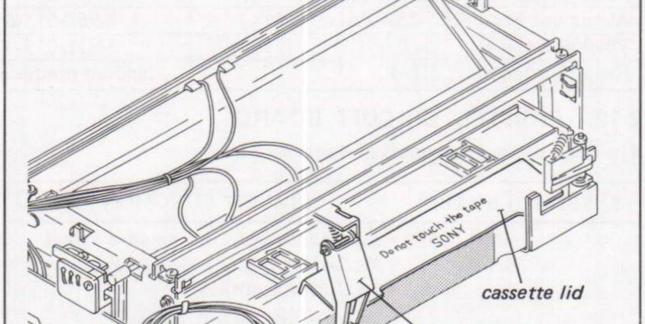


(2) Cassette In Switch
The cassette tape is inserted by hand further after the DOWN switch operates (until the cassette is stopped).
The Ⓐ shutter covers the photo-interrupter on the CC-10 board and the IN switch turns to "H".



(3) Cassette Compartment Motor (C.C. Motor)
When the IN switch turns to "H" after the cassette insertion, about 11.3 V is impressed on the C.C. motor via the CC-9 board and the motor starts. The power of the motor moves the cassette compartment through the belt and the gears.

(4) Cassette Tape Lid Opener
When the cassette tape is inserted, the C.C. motor rotates, and the cassette compartment moves.
The lid opener arm holds the bottom section of the cassette lid at the point where the horizontal movement of the cassette compartment changes to the vertical movement. The lid is opened following with the downward movement of the cassette compartment.



2-14. TAPE TENSION CONTROL MECHANISM

The tape tension control mechanism of VO-5850P is composed with the mechanical and electrical tape tension control mechanisms.

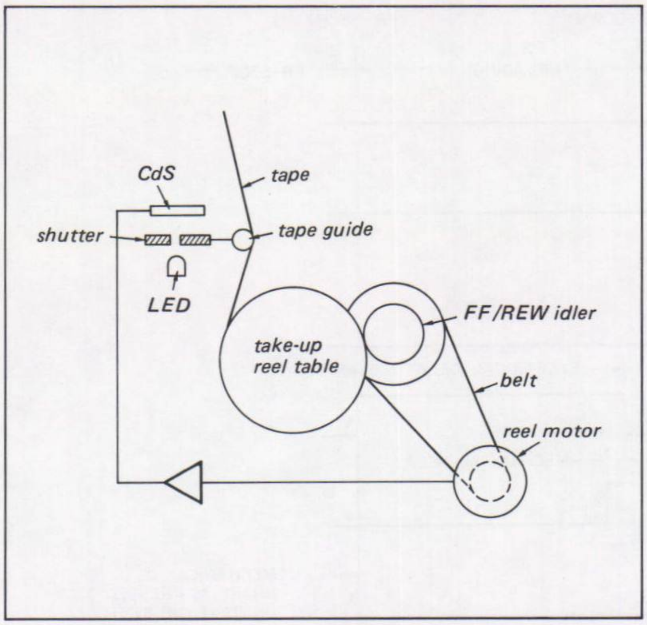
(1) The tape tension control mechanism in normal playback, record, FWD search and unthreading modes (when the take-up reel table rotates in the counterclockwise direction (except FF mode)) is as follows:

(i) Tape feeding side (supply reel table side)
The tape back tension control mechanism of the tape feeding side is the same as the conventional VTR. This back tension control mechanism is the mechanical tape tension control mechanism.

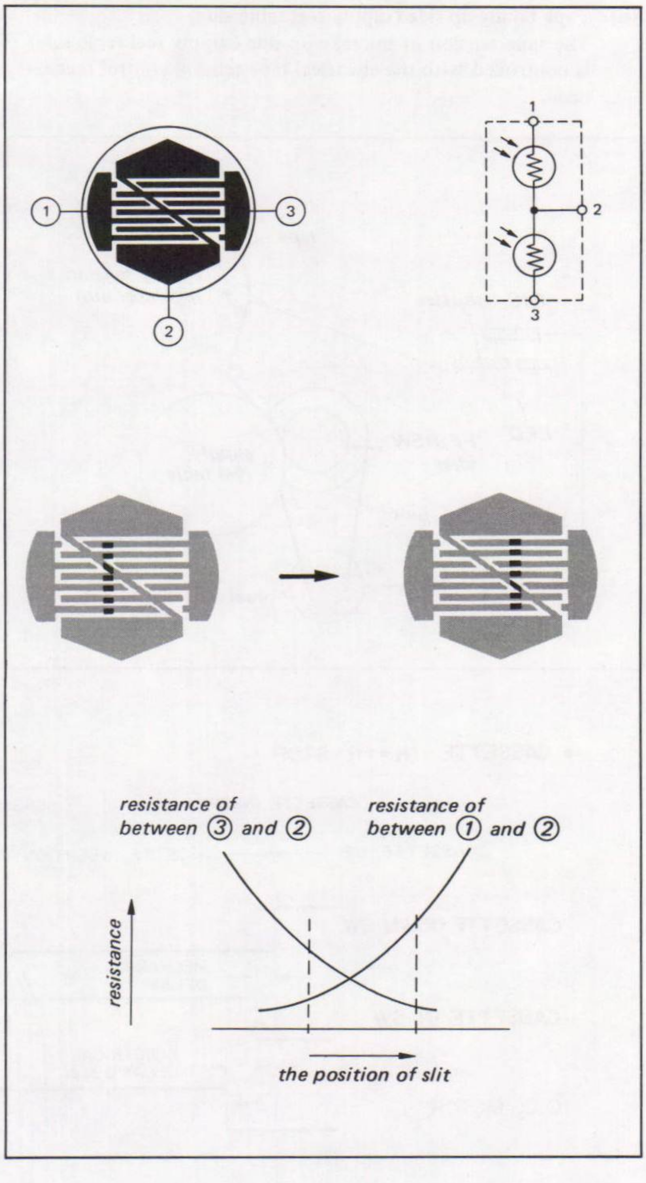
Tension Arm → Brake Band → Supply Reel Table
(Tape Tension) ← Skew Control

(ii) Tape taking-up side (take-up reel table side)
The tape tension of the take-up side is controlled with the electrical tape tension control mechanism. The R brake shoe is released from the take-up reel table in this mode. The electrical tape tension control mechanism is composed with the following blockes.

Tension Arm → Shutter → LED ↓ CdS → Reel Motor Torque is controlled with this output
(Tape Tension)



The light emitted by an LED is received by the CdS detector element through a slit on the shutter connected with the tape guide. The electrodes' pattern of this CdS is shown in figure.
The slit moves with the tape tension change and the point where the light reflector moves. Then the resistance values between ① ~ ② and the resistance between ③ ~ ② are vary. The tape tension around the tension detector tape guide is detected by the resistance variation. This resistance variation output controls the reel motor torque and the tape tension is controlled.

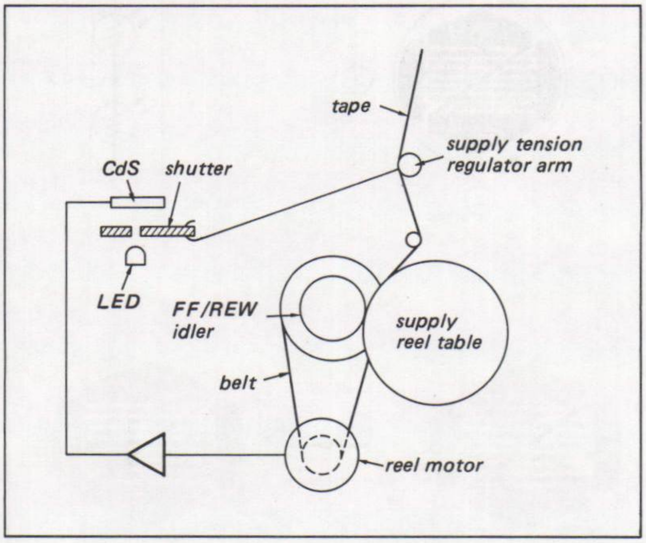


(2) The tape tension control mechanism in REV search mode (when the supply reel table rotates in the counterclockwise direction (except REW mode)) is as follows:

(i) Tape feeding side (take-up reel table side)
The tape is supplied from the take-up reel table in this mode. The tape tension control mechanism is the same as the supply side tape tension control mechanism as mentioned former.

Tension Arm → R Brake Shoe → Take-up Reel Table
(Tape Tension)

(ii) Tape taking-up side (supply reel table side)
The tape tension of the take-up side (supply reel table side) is controlled with the electrical tape tension control mechanism.

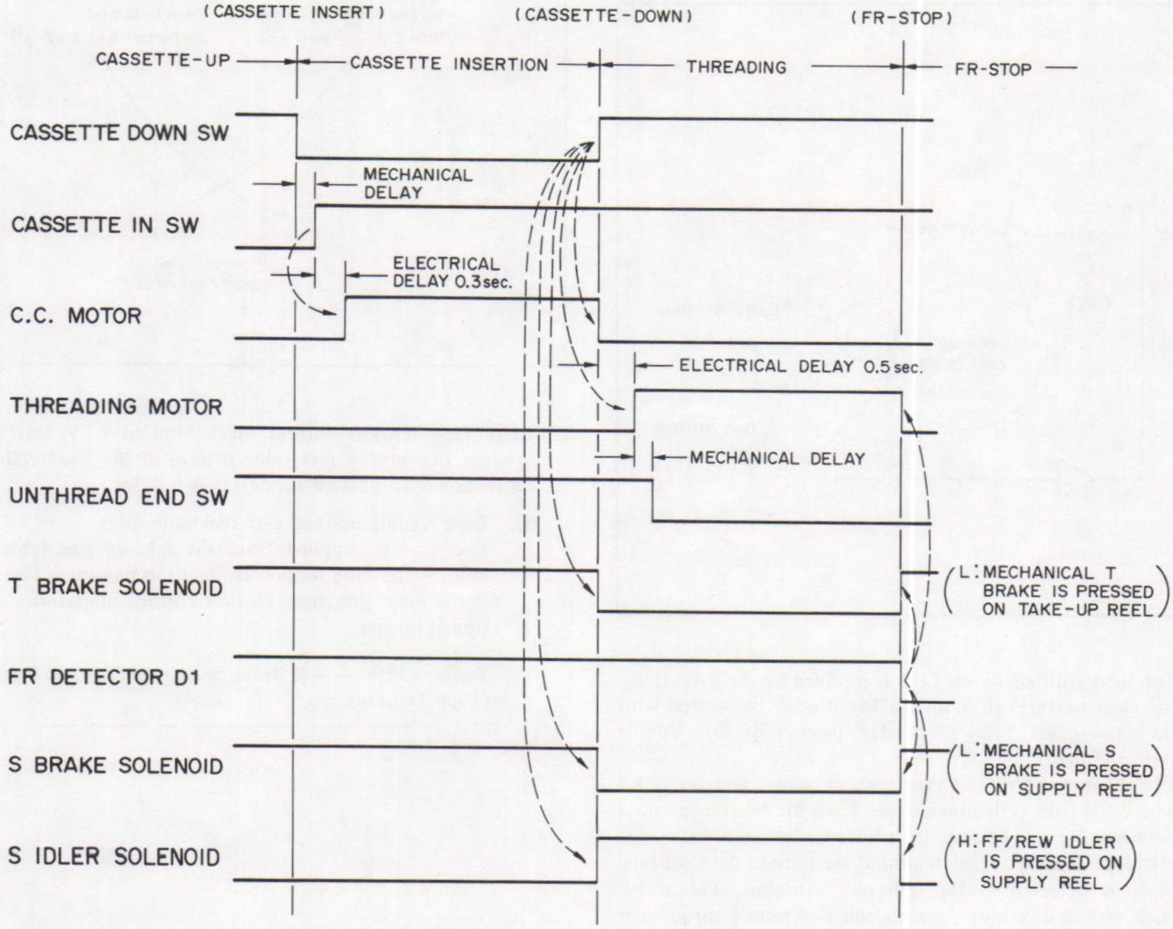

tape
supply tension regulator arm
CdS
shutter
LED
FF/REW idler
supply reel table
belt
reel motor

2-15. TIMING OF SWITCH, MOTOR AND SOLENOID

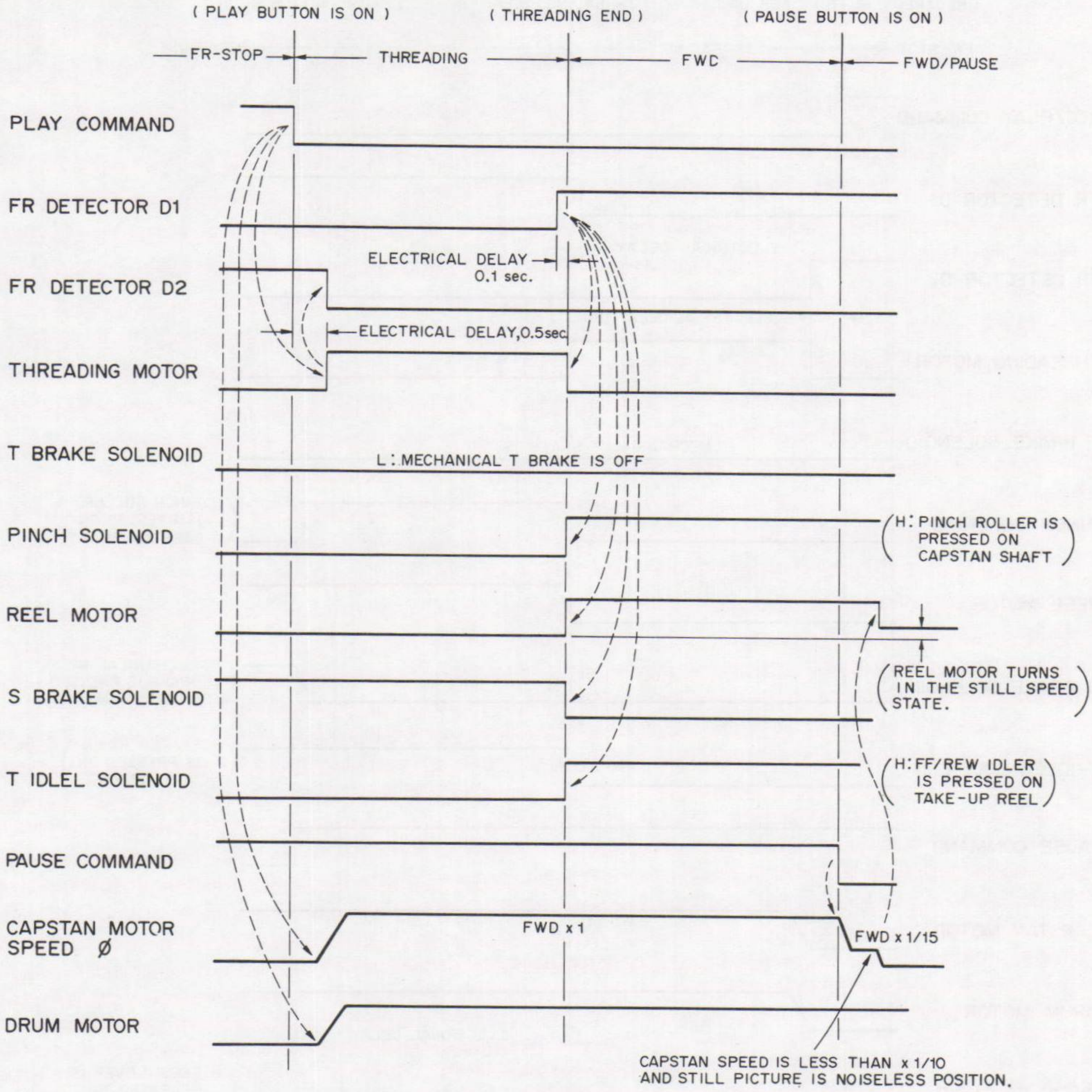
- The timing of the electronic switches, motors and solenoids in the following modes are follows.

Cassette in → FR-STOP
FR-STOP → FWD → FWD/PAUSE
FR-STOP → REC → REC/PAUSE
FWD → FWD SEARCH → REV SEARCH
FWD → FR-STOP
FR-STOP → FF → FR-STOP
FR-STOP → EJECT Completion

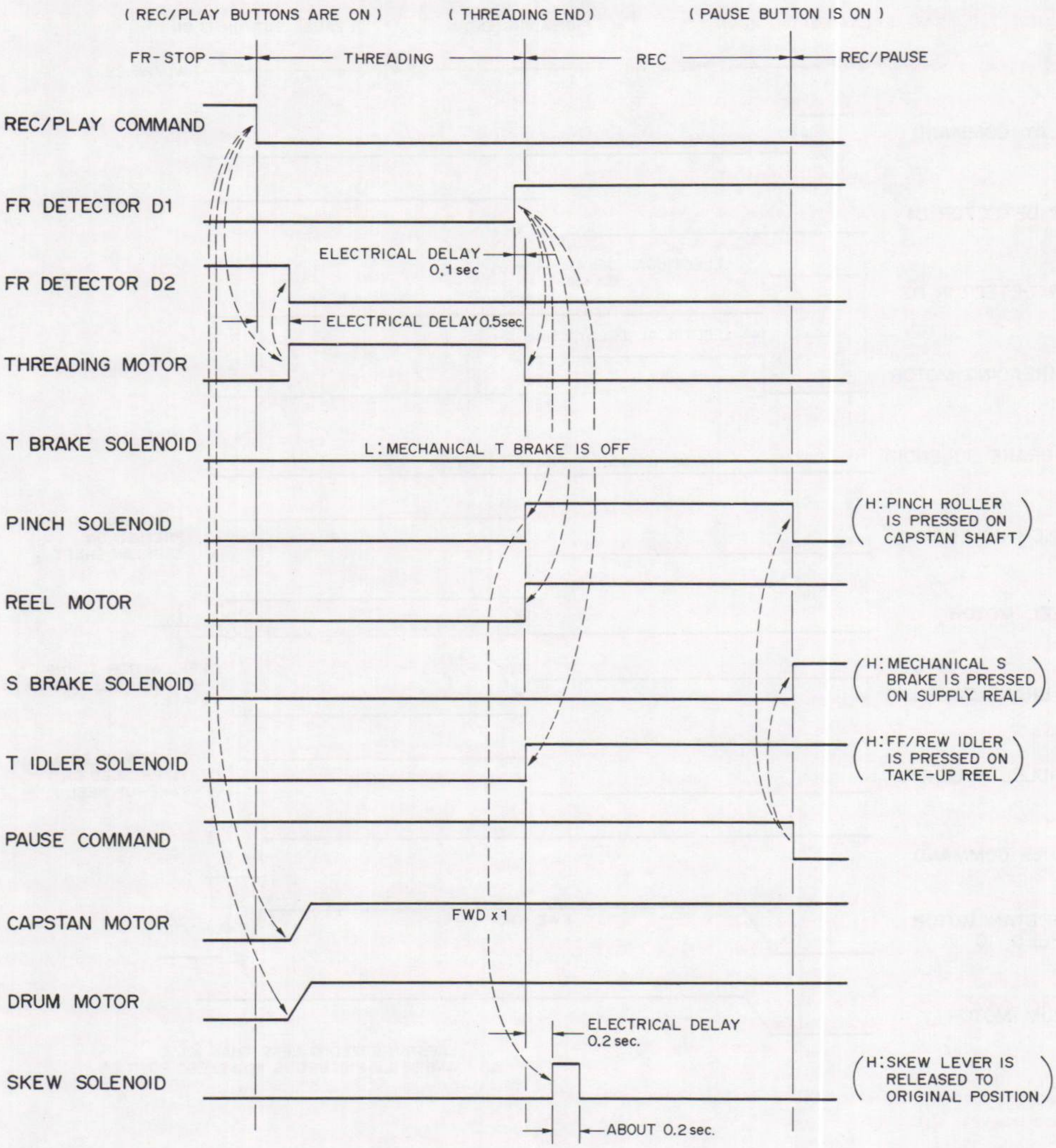
- CASSETTE - IN→FR - STOP



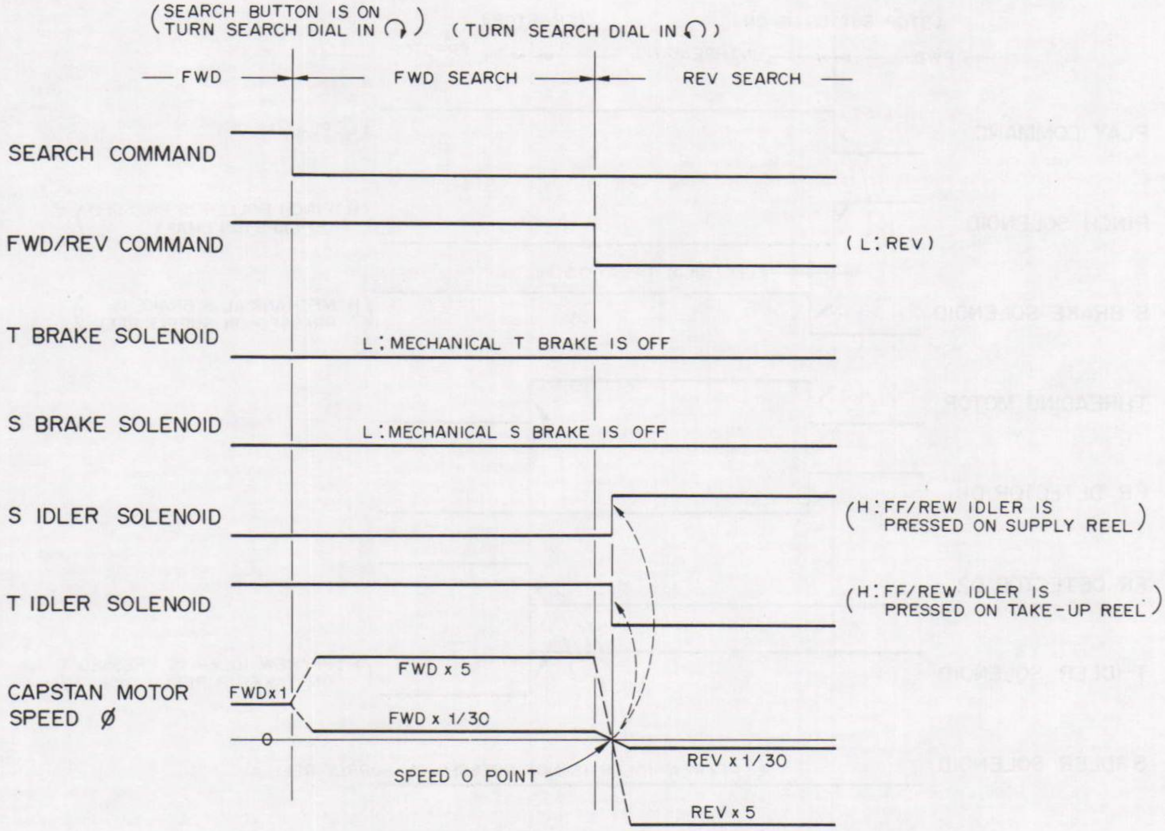
- FR – STOP → FWD → FWD/PAUSE


(PLAY BUTTON IS ON)
(THREADING END)
(PAUSE BUTTON IS ON)
FR-STOP
THREADING
FWD
FWD/PAUSE
PLAY COMMAND
FR DETECTOR D1
ELECTRICAL DELAY 0.1 sec.
FR DETECTOR D2
ELECTRICAL DELAY, 0.5 sec.
THREADING MOTOR
T BRAKE SOLENOID
L : MECHANICAL T BRAKE IS OFF
PINCH SOLENOID
(H: PINCH ROLLER IS PRESSED ON CAPSTAN SHAFT)
REEL MOTOR
(REEL MOTOR TURNS IN THE STILL SPEED STATE.)
S BRAKE SOLENOID
T IDLEL SOLENOID
(H: FF/REW IDLER IS PRESSED ON TAKE-UP REEL)
PAUSE COMMAND
CAPSTAN MOTOR SPEED Ø
FWD x 1
FWD x 1/15
DRUM MOTOR
CAPSTAN SPEED IS LESS THAN x 1/10 AND STILL PICTURE IS NOISELESS POSITION.

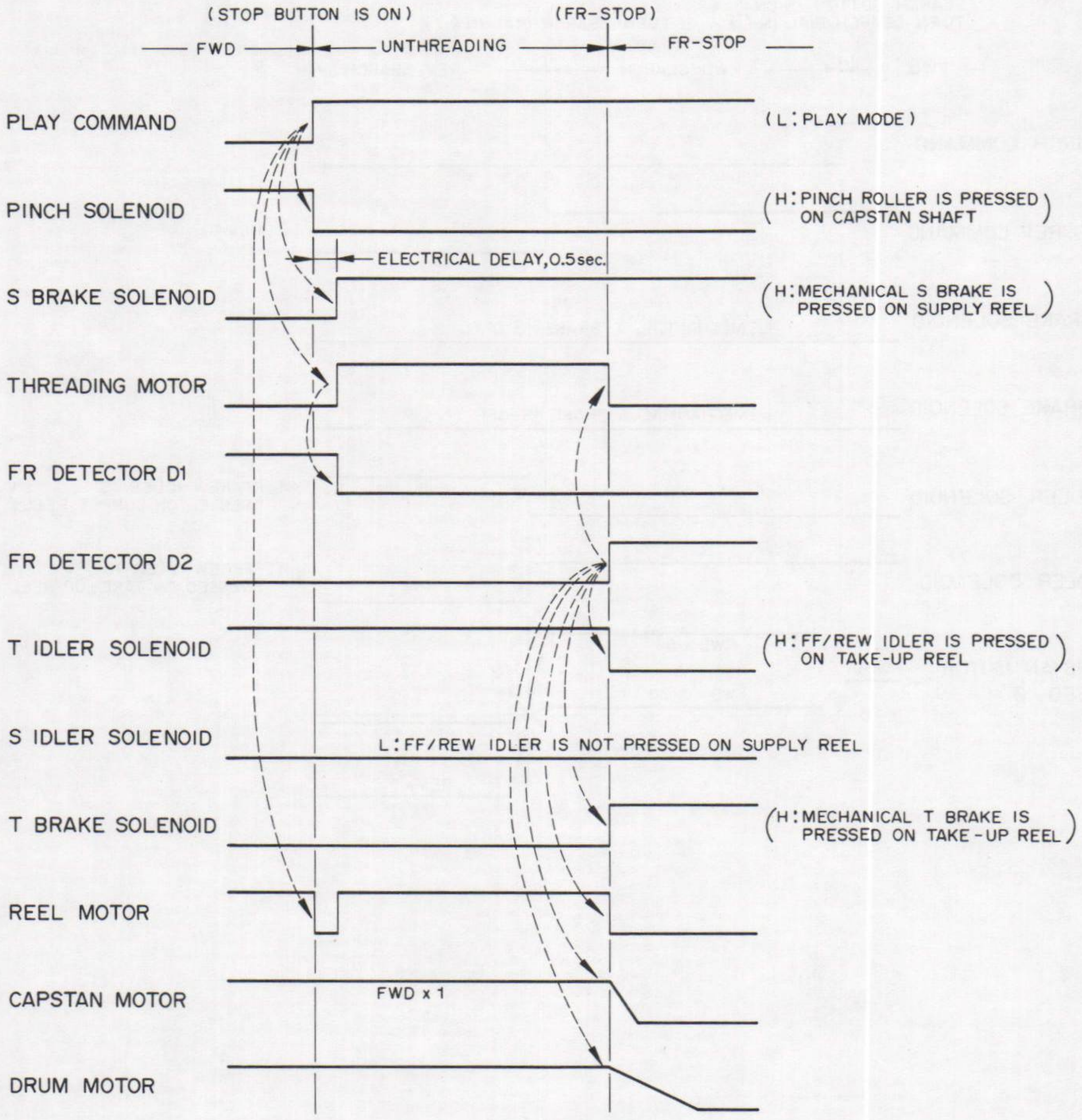
- FR-STOP → REC → REC/PAUSE


(REC/PLAY BUTTONS ARE ON)
(THREADING END)
(PAUSE BUTTON IS ON)
FR-STOP
THREADING
REC
REC/PAUSE
REC/PLAY COMMAND
FR DETECTOR D1
ELECTRICAL DELAY 0.1 sec
FR DETECTOR D2
ELECTRICAL DELAY 0.5sec.
THREADING MOTOR
T BRAKE SOLENOID
L: MECHANICAL T BRAKE IS OFF
PINCH SOLENOID
(H: PINCH ROLLER IS PRESSED ON CAPSTAN SHAFT)
REEL MOTOR
S BRAKE SOLENOID
(H: MECHANICAL S BRAKE IS PRESSED ON SUPPLY REAL)
T IDLER SOLENOID
(H: FF/REW IDLER IS PRESSED ON TAKE-UP REEL)
PAUSE COMMAND
CAPSTAN MOTOR
FWD x1
DRUM MOTOR
ELECTRICAL DELAY 0.2 sec.
SKEW SOLENOID
(H: SKEW LEVER IS RELEASED TO ORIGINAL POSITION)
ABOUT 0.2 sec.

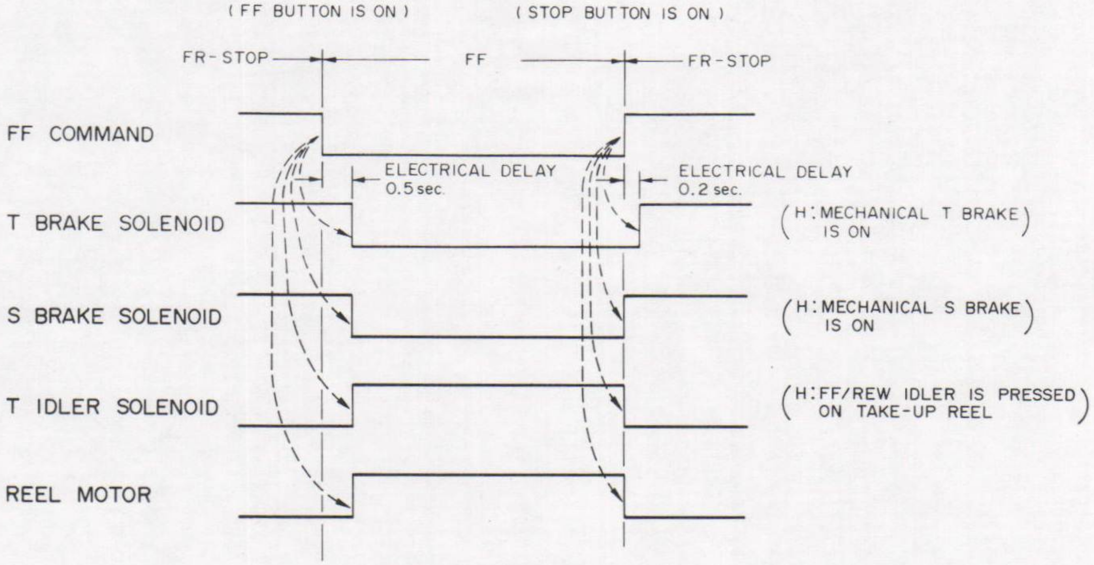
- FWD → FWD SEARCH → REV SEARCH


(SEARCH BUTTON IS ON TURN SEARCH DIAL IN ↷)
(TURN SEARCH DIAL IN ↶)
FWD
FWD SEARCH
REV SEARCH
SEARCH COMMAND
FWD/REV COMMAND
(L: REV)
T BRAKE SOLENOID
L: MECHANICAL T BRAKE IS OFF
S BRAKE SOLENOID
L: MECHANICAL S BRAKE IS OFF
S IDLER SOLENOID
(H: FF/REW IDLER IS PRESSED ON SUPPLY REEL)
T IDLER SOLENOID
(H: FF/REW IDLER IS PRESSED ON TAKE-UP REEL)
CAPSTAN MOTOR SPEED Ø
FWDx1
0
FWD x 5
FWD x 1/30
SPEED 0 POINT
REV x 1/30
REV x 5

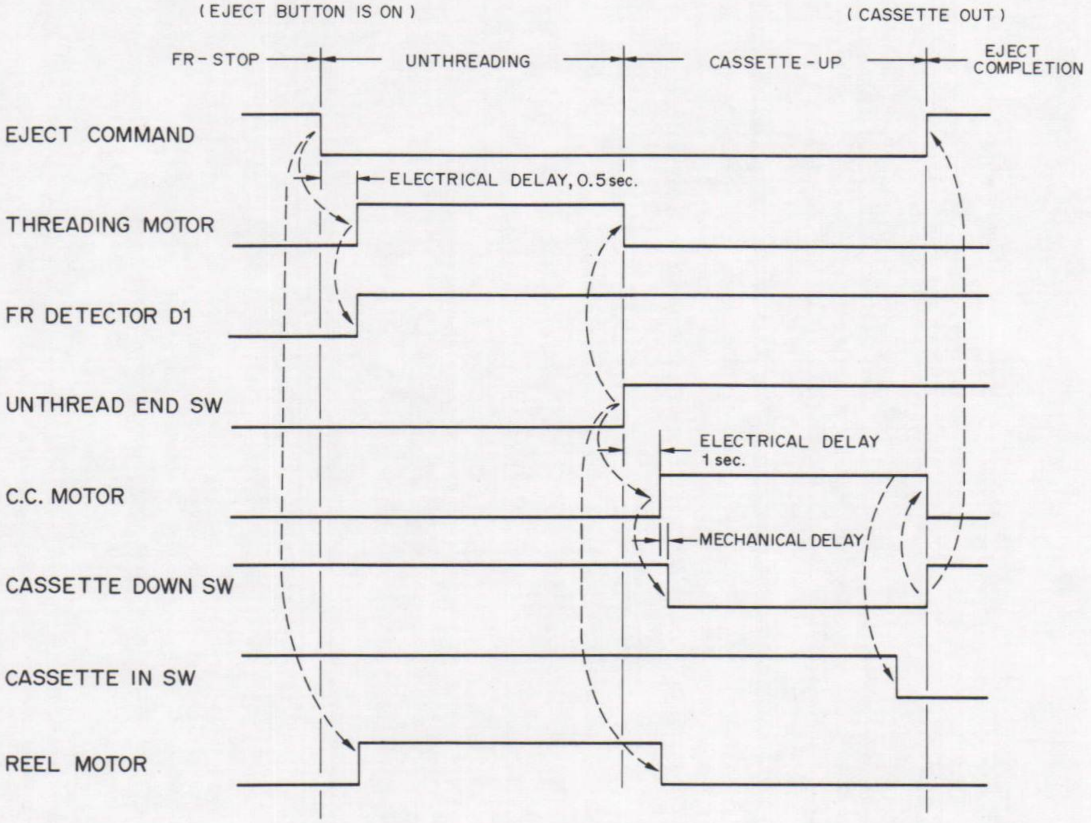
- FWD → FR-STOP


(STOP BUTTON IS ON)
(FR-STOP)
FWD
UNTHREADING
FR-STOP
PLAY COMMAND
(L: PLAY MODE)
PINCH SOLENOID
(H: PINCH ROLLER IS PRESSED ON CAPSTAN SHAFT)
ELECTRICAL DELAY, 0.5sec.
S BRAKE SOLENOID
(H: MECHANICAL S BRAKE IS PRESSED ON SUPPLY REEL)
THREADING MOTOR
FR DETECTOR D1
FR DETECTOR D2
T IDLER SOLENOID
(H: FF/REW IDLER IS PRESSED ON TAKE-UP REEL)
S IDLER SOLENOID
L: FF/REW IDLER IS NOT PRESSED ON SUPPLY REEL
T BRAKE SOLENOID
(H: MECHANICAL T BRAKE IS PRESSED ON TAKE-UP REEL)
REEL MOTOR
CAPSTAN MOTOR
FWD x 1
DRUM MOTOR

- FR-STOP → FF → FR-STOP


(FF BUTTON IS ON)
(STOP BUTTON IS ON)
FR-STOP
FF
FR-STOP
FF COMMAND
ELECTRICAL DELAY 0.5 sec.
ELECTRICAL DELAY 0.2 sec.
T BRAKE SOLENOID
(H: MECHANICAL T BRAKE IS ON)
S BRAKE SOLENOID
(H: MECHANICAL S BRAKE IS ON)
T IDLER SOLENOID
(H: FF/REW IDLER IS PRESSED ON TAKE-UP REEL)
REEL MOTOR

- FR-STOP → EJECT COMPLETION


(EJECT BUTTON IS ON)
(CASSETTE OUT)
FR-STOP
UNTHREADING
CASSETTE-UP
EJECT COMPLETION
EJECT COMMAND
ELECTRICAL DELAY, 0.5 sec.
THREADING MOTOR
FR DETECTOR D1
UNTHREAD END SW
ELECTRICAL DELAY 1 sec.
C.C. MOTOR
MECHANICAL DELAY
CASSETTE DOWN SW
CASSETTE IN SW
REEL MOTOR

SECTION 3
PERIODIC CHECK AND MAINTENANCE

It is recommended to perform the maintenance and the periodic check mentioned below for the best operation of the function and performance of the machine and for prolonging the lives of the machine and the tape.

3-1. MAINTENANCE AFTER REPAIRS

Perform the following maintenance after the repair without regarding the operating hours of the machine.

(1) Cleaning of video heads and rotary erase heads

- Press the cleaning piece moistured with the cleaning fluid and turn the drum slowly with the hand, cleaning the heads. (Never turn the motor by the electric power for the cleaning.)
- Never move the cleaning piece in the vertical direction of the head tip in the cleaning. It tends to damage the head tips.

(2) Cleaning of tape running system

- Wipe the tape bearing surfaces (of the tape guide, drum, capstan, and pinch roller) with cleaning piece saturated with the cleaning fluid.

(3) Cleaning of drive system

- Wipe the drive system (such as belt, idler, and reel table surface) with cleaning piece saturated with the cleaning fluid.

3-2. PERIODIC CHECK

Perform the maintenance checks described separately in accordance with the operational hours of the machine.

3-3. HOURS METER

The VO-5850P has an hours meter on the ML-1 board for the periodic check and the maintenance. The hours meter accumulates and records the elapsed time of all the modes in which the drum rotates while the tape is threaded. It is recommended that the hours meter is used as a tool for determining the periodic check. When the hours meter indicates the maximum value, 1000 hours, the hours meter must be replaced with a new one.
(SONY Part No.: 1-548-119-00)

3-4. OTHERS

(1) SONY oil

- Be sure to use the SONY oil as the lubrication oil. (If oil other than the SONY oil is used, various troubles due to a different viscosity tends to be caused.)

SONY oil: Part No. 7-661-018-01

- Use the SONY oil in which dust or other foreign material have not mixed for lubricating the bearing. (If foreign material is in the oil, wear or burning of the bearing tends to be caused.)

(2) Grease

Be sure to use the following grease.
SONY grease: Part No. 7-662-001-62 (SGL-501)

(3) Regarding overhaul of equipment

When overhaul of an equipment is attempted, replace parts referring list. For the parts not listed in the list, such as motors and heads, refer the following items.

Reel motor;	about 3,000H
Capstan motor;	about H
Threading motor;	about H
Cassette-up compartment motor;	about H
Audio/CTL head;	about 3,000H
CTL/Erase head;	about H

■ : apply oil ○ : cleaning ◆ : replace ◇ : check ◎: apply a grease

	Operating Hours (H)											
Item	Part No. of Replacement Parts	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	Remarks
Tape path cleaning	——	○	○	○	○	○	○	○	○	○	○	Perform whenever repair work is attempted
Video heads cleaning and replace	A-6709-102-A	○	◆	○	◆	○	◆	○	◆	○	◆	Life of the video heads are affected extensively by operating ambient conditions
Replacement of pinch roller	A-6750-125-A	○	◆	○	◆	○	◆	○	◆	○	◆	Life of the pinch roller are affected extensively by operating systems
Replacement of FF/REW idler belt	3-668-785-00	○	○	○	◆	○	○	○	◆	○	○	
Replacement of reel table	A-6739-016-A	○	■	○	◆	○	■	○	◆	○	■	
Replacement of R brake shoe	X-3668-737-0	–	–	–	◆	–	–	–	◆	–	–	
Replacement of brake band	X-3668-707-0	–	–	–	◆	–	–	–	◆	–	–	
Replacement of brush	A-6709-360-A or 3-607-104-00	–	–	–	–	–	◆	–	–	–	–	
Replacement of belt on gear box	3-668-946-00	○	○	○	○	○	○	○	◆	○	○	
Replacement of belt on cassette-up compartment	3-653-387-00	○	○	○	○	○	○	○	◆	○	○	
Cleaning the shaft of the threading roller on the threading ring	——	–	○	–	○	–	○	–	○	–	○	Clean with a cloth dampened with a cleaning fluid
Apply a grease on the ring rollers	——	–	◎	–	◎	–	◎	–	◎	–	◎	Apply a grease on the surface of the ring roller
Check the FWD back tension	——	–	◇	–	◇	–	◇	–	◇	–	◇	Refer to sec. 6-6
Check the FWD torque	——	–	◇	–	◇	–	◇	–	◇	–	◇	Refer to sec. 6-3
Check the REV torque	——	–	◇	–	◇	–	◇	–	◇	–	◇	Refer to sec. 6-4
Check the brake torque	——	–	–	–	◇	–	–	–	◇	–	–	Refer to sec. 6-1

SECTION 4
REPLACEMENT OF MAJOR PARTS

4-1. REPLACEMENT OF UPPER DRUM ASSEMBLY

- The rotary video and erase heads cannot be replaced individually; the whole upper drum assembly must be replaced when any one of these heads fails.

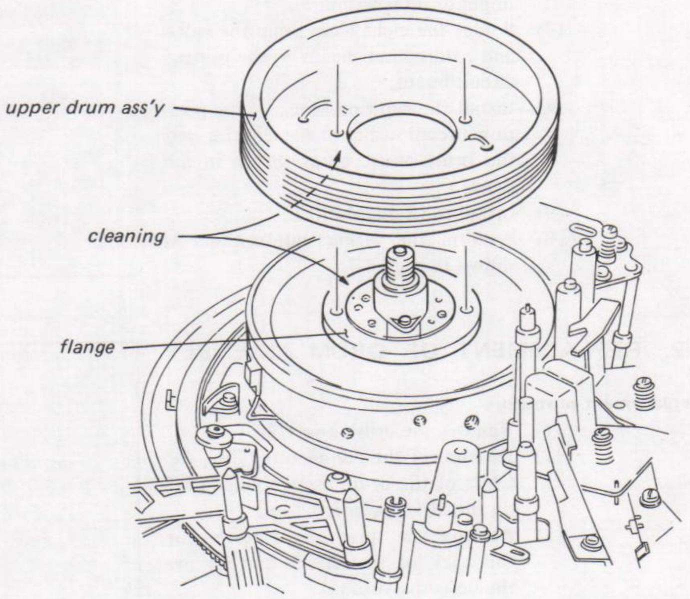
Tool:	Drum eccentricity gauge (1) Drum eccentricity gauge (2) Drum eccentricity gauge (3) Drum eccentricity gauge (4) Cleaning fluid

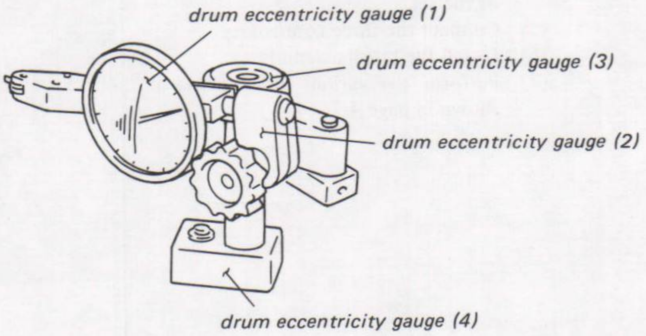
Replacement procedure:

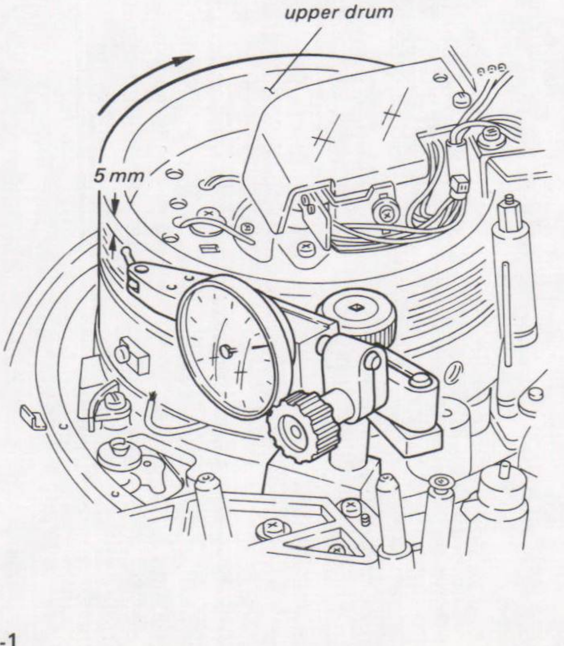
(1) Remove the slip-ring block.
(2) Unsolder the eight leads of the video head and rotary erase heads from the printed circuit board and remove the upper drum assembly from the head drum assembly.
(3) Clean the matching surfaces of the flange and new upper drum assembly with a cloth moistened with cleaning fluid. (If there is a spacer between drum and flange, it should be remain in place, or be re-installed in the same place with the new upper drum assembly.)
(4) Place the upper drum assembly so that the head of the white leads is close to the round indentation on the surface of the flange. (The rounded indentation can be seen through the hole in the end of the printed circuit board the white leads are connected to). Thread the two screws snugly but do not tighten.

Adjustment procedure:

(1) Remove the S guard block (Because the S guard's bottom connector is inserted into the connector on the chassis, it need the power to remove.)
(2) Assemble the drum eccentricity gauges (1), (2), (3) and (4) as shown in figure. Mount the assembled gauges on the machine so that the tip probe positiones at the point about 5 mm apart from the top edge of the upper drum.
(3) Turn the upper drum slowly clockwise and confirm the pointer deflection of the gauge is within 5μ during one complete turn of the upper drum. If this specification is satisfied, proceed with step (5). If it is not, perform step (4).
(4) Tap the inside of the upper drum with a nylon hammer or a screwdriver handle and like so that the gauge deflection remains within 5μ.
(5) After the adjustment, tighten the two screws that are securing the upper drum, alternately and gradually using a tightening torque: 14 ~ 16 kg.cm.




drum eccentricity gauge (1)
drum eccentricity gauge (3)
drum eccentricity gauge (2)
drum eccentricity gauge (4)



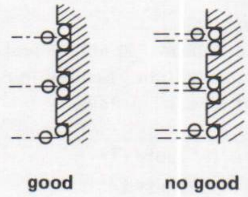
(6) After the screws are tightened, check again that the eccentricity of the upper drum is within 5μ.

(7) Solder the eight leads from the video and rotary erase heads to the printed circuit board.

(8) Install the slip-ring block. (The positional relationship of the slip-ring and the brush must be as shown in the figure.)

(9) Install the S guard block.

(10) Perform the various adjustments as shown in page 4-7.



4-2. REPLACEMENT OF DRUM ASSEMBLY

Replacement procedure:

(1) Remove the brush assembly.

(2) Disconnect the connectors (CN1 and CN2) of the drum assembly and CN6 on the MP-12A board.

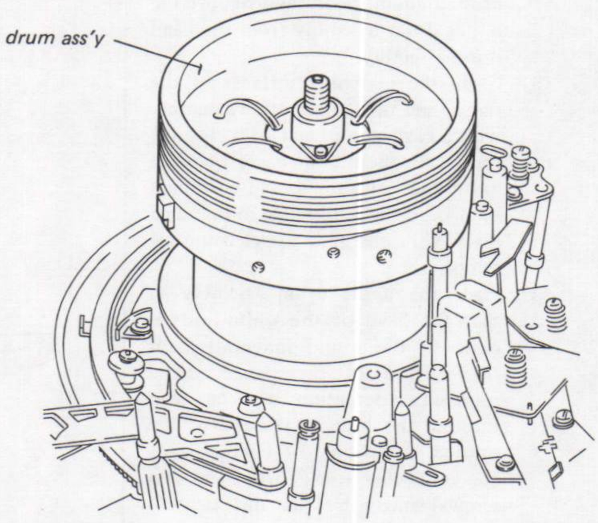
(3) Remove the three fixing screws on the back of the chassis and remove the defective drum.

(4) Install the drum on the base while turning the drum assembly in the clockwise direction as seen from top of the set.

(5) Connect the three connectors.

(6) Install the brush assembly.

(7) Perform the various adjustments as shown in page 4-7.



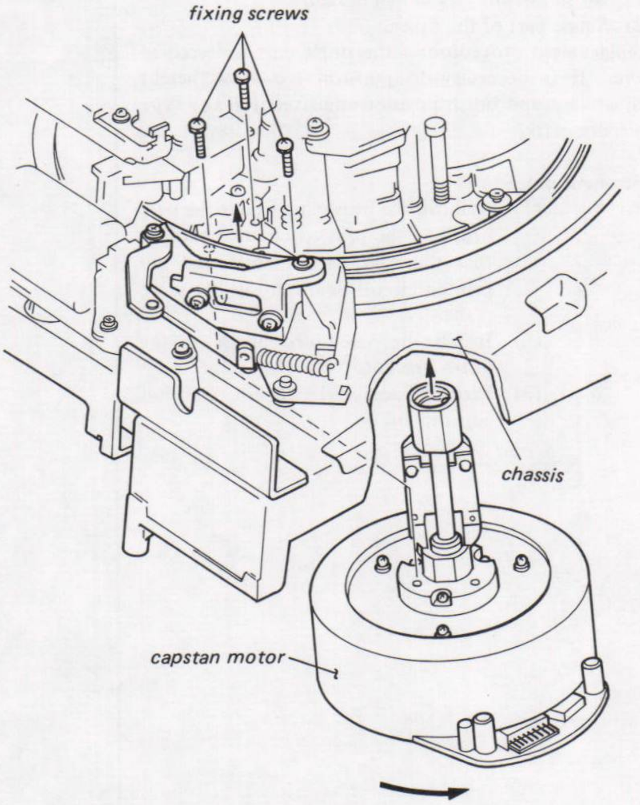
4-3. REPLACEMENT OF CAPSTAN MOTOR

Replacement procedure:

(1) Remove the capstan motor.

(2) Install the new capstan motor and thread three fixing screws snugly but do not tighten.

(3) While turning the capstan motor in the counterclockwise direction as seen from top of the set and tighten the fixing screws.

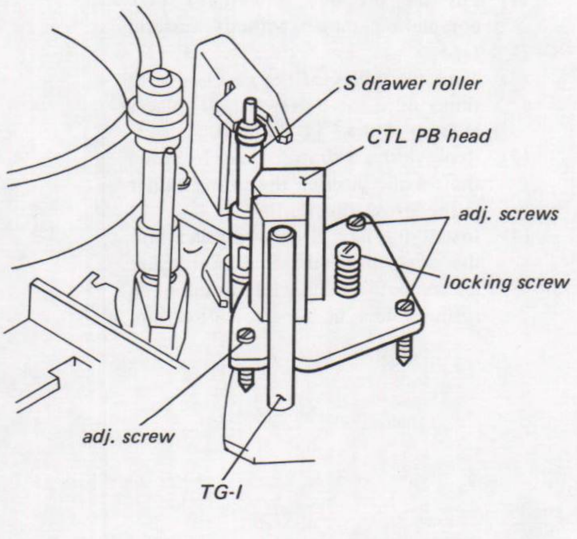

fixing screws
chassis
capstan motor

4-4. REPLACEMENT OF CTL PB HEAD

Replacement procedure:

(1) Remove the locking screw and remove the CTL PB head from the chassis.
Do not tighten or loosen three adjusting screws.

(2) Loosen the two fixing screws under the bracket and replace the CTL PB head.

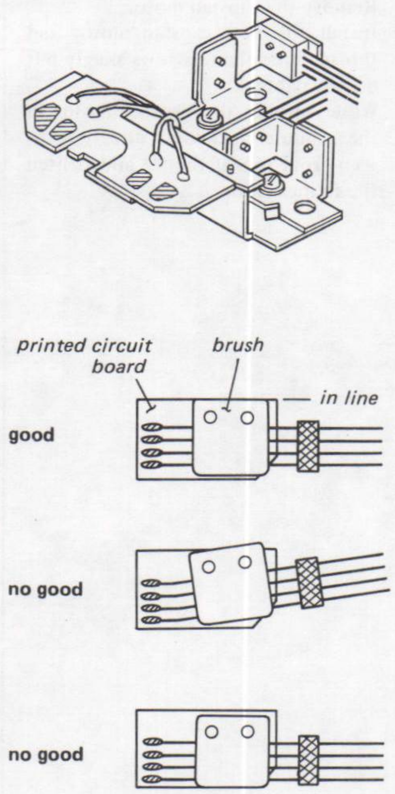

S drawer roller
CTL PB head
adj. screws
locking screw
adj. screw
TG-I

4-5. REPLACEMENT OF BRUSH

- Spare parts of brush is prepared as the following types.
  (1) Brush assembly as shown in figure.
  (2) Single part of the brush.
  Replacement procedure of the single part is described here. It is necessary to perform the brush height adjustment and brush position adjustment in any type of spare parts.

Replacement procedure:

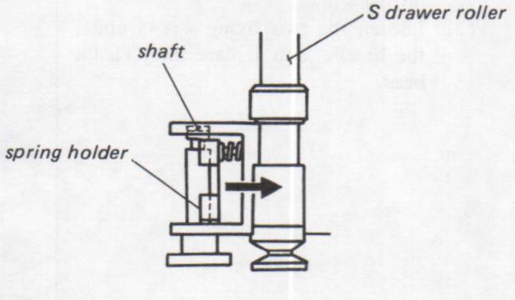
(1) Remove the brush and solder the new brush to the printed circuit board so that the edge of the brush and the printed circuit board are in the same plane.
(2) Install the assembled brush on the brush bracket.
(3) Perform sec. 5-10 brush position adjustment.

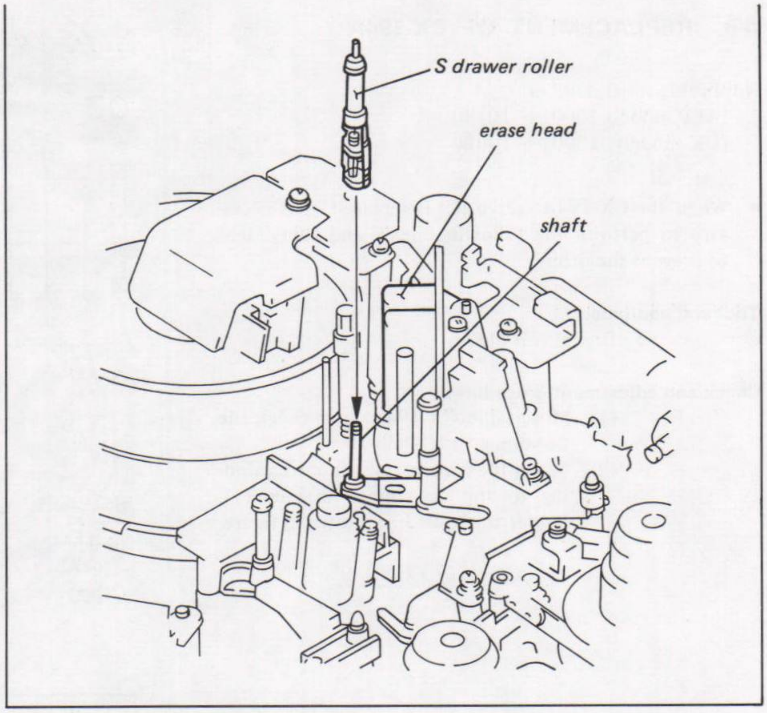


4-6. REPLACEMENT OF S DRAWER ROLLER

Replacement procedure:

(1) Put the machine into the EJECT completion mode without cassette tape.
(2) Turn the pulley of the gear box with finger until the S drawer roller places in front of the CTL PB head.
(3) Remove the S drawer roller from the shaft while pushing the spring holder in the arrow direction.
(4) Install the new S drawer roller into the shaft until the S drawer roller lockes to the shaft while pushing the spring holder in the arrow direction.




S drawer roller
erase head
shaft

4-7. REPLACEMENT/ADJUSTMENT OF TAPE GUIDES ON THREADING RING

Tool and equipment:

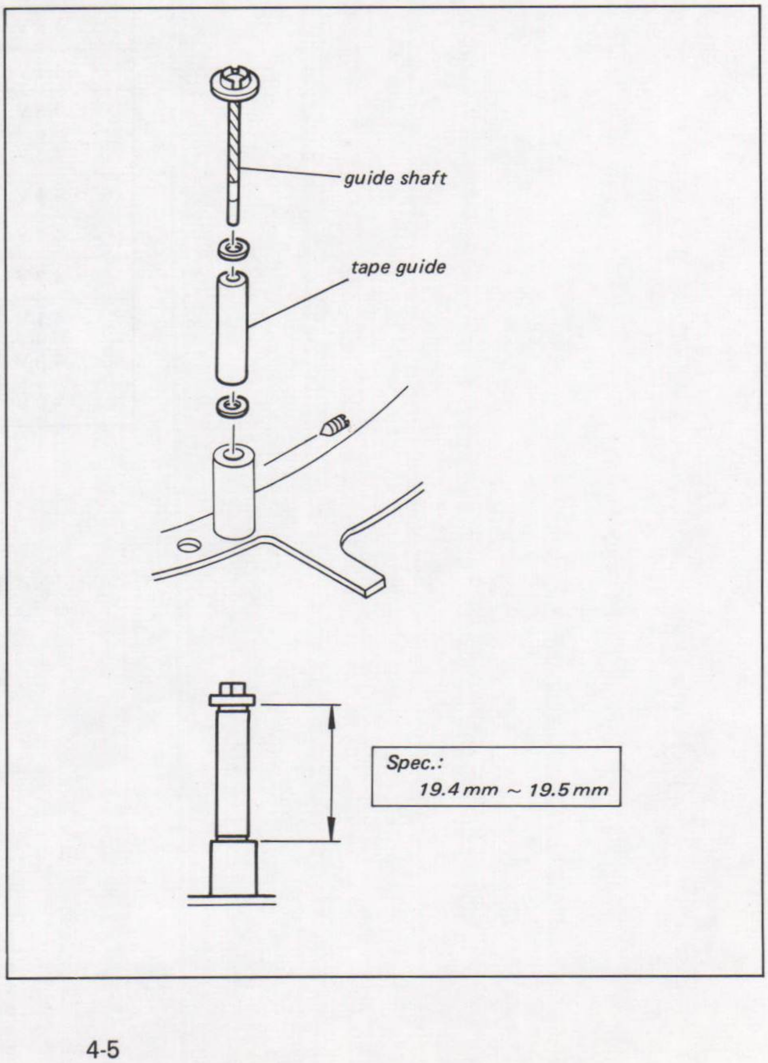
Slide vernier calliper or the equivalent.
Cleaning fluid.

Replacement procedure:

(1) Remove the tape guide.
(2) Clean the surface of the shaft with a cloth dampened with a cleaning fluid.
(3) Assemble the parts.
(4) The sub-ring upper tape guide and lower tape guide are necessary to perform the guide width adjustment.

Adjustment procedure:

(1) Adjust the tape guide width to meet the required specification.


guide shaft
tape guide
Spec.:
19.4 mm ~ 19.5 mm

4-8. REPLACEMENT OF CX-194A

Applicable serial number
(AEP model) 10001 ~ 10180
(UK model) 10001 ~ 10020

- When the CX-194A (servo IC) is replaced, it is necessary to perform the following check and adjustment to prevent the jitter.

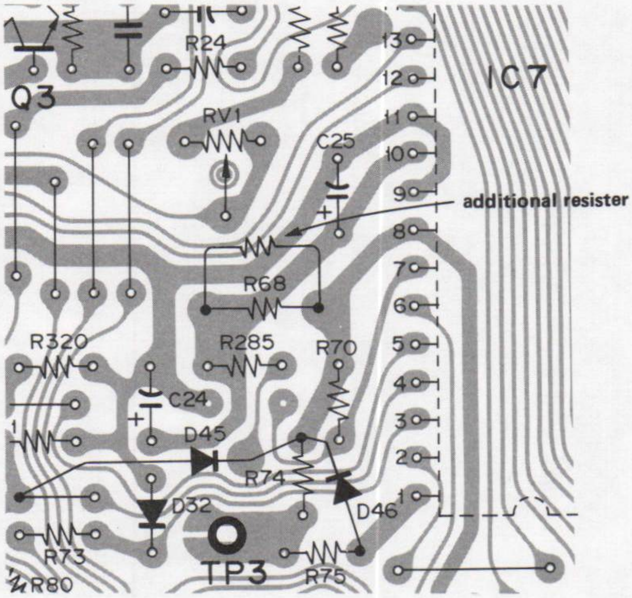
Tool and equipment:

Digital volt meter.

Check and adjustment procedures:

(1) Mount the CX-194A, and check the dc voltage at IC7 pin 10.

(2) Select the carbon resistor corresponding to the dc voltage in step (1). Solder the resistor as shown in figure.


Q3
R24
RV1
C25
IC7
13
12
11
10
9
8
7
6
5
4
3
2
1
additional resister
R68
R320
R285
R70
C24
D45
R74
D32
D46
TP3
R73
R75
R80

(SV-31A)

dc level	additional resistor	part number
more than 4.9 V	non	———
4.8 V	2 kΩ, ¼W, Carbon	1-246-480-00
4.7 V	1.5 kΩ, ¼W, Carbon	1-246-477-00
4.6 V	1 kΩ, ¼W, Carbon	1-246-473-00
4.5 V	680Ω, ¼W, Carbon	1-246-469-00
4.4 V	510Ω, ¼W, Carbon	1-246-466-00
4.3 V	430Ω, ½W, Carbon	1-244-864-00
4.2 V	330Ω, ½W, Carbon	1-244-861-00
4.1 V	270Ω, ½W, Carbon	1-244-859-00
4.0 V	200Ω, ½W, Carbon	1-244-856-00
3.9 V	160Ω, ½W, Carbon	1-244-854-00

4-9. ADJUSTMENT ITEM TABLE AFTER MAIN PARTS REPLACEMENT

Replacement Parts	Adjustment Items
• Threading Ring	Threading Ring Rotation Adjustment (5-3-1) → Bear Box Position Adjustment (5-3-2) → FR Detector Block Mounting Position Adjustment (5-3-4) → Pinch Roller Self-Alignment Adjustment (5-3-3) → Pinch Lever Pre-set Adjustment (5-4-1) → Pinch Roller Pre-set Adjustment (5-4-2) → FF and REW Modes Tape Path Adjustment (7-1) → T Correction Guide Slantness Adjustment (7-2) → Tape Path Adjustment Around Pinch Roller (7-6, (7-6-1, 7-6-2)) → FWD Mode Tape Path Adjustment (1) (7-3) → FWD Mode Tape Path Adjustment (2) (7-4) → REV Mode Tape Path Adjustment (7-5) → 10 Times Picture Search Mode Tape Path Adjustment (7-7) → Video Tracking Adjustment (7-8-1) → CTL. PB Head Height/Azimuth/Zenith Adjustment (7-8-2) → Video Tracking Adjustment (check). (7-8-1)
• Pinch Roller	Pinch Roller Self-Alignment Adjustment (5-3-3) → Pinch Roller Pre-set Adjustment (5-4-2) → FWD Mode Tape Path Adjustment (2) (7-4) → REV Mode Tape Path Adjustment (7-5) → Tape Path Adjustment Around Pinch Roller (7-6, (7-6-1, 7-6-2)) → 10 Times Picture Search Mode Tape Path Adjustment (7-7) → Video Tracking Adjustment (check). (7-8-1)
• Take-up Reel Table	Reel Table Height and Vertical Play Adjustment (5-1-2) → T Brake Torque Adjustment (6-1-2) → REW Brake Torque Adjustment (6-1-3) → FF and REW Torque Adjustment (6-2) → FWD Torque Adjustment (6-3) → FF and REW Tape Path Adjustment. (7-1)
• Supply Reel Table	Reel Table Height and Vertical Play Adjustment (5-1-2) → S Brake Torque Adjustment (6-1-1) → FF and REW Torque Adjustment (6-2) → REV Torque Adjustment (6-4) → FF Back Tension Adjustment (6-5) → FWD Back Tension Adjustment (6-6) → Video Tracking Adjustment (check). (7-8-1)
• Brake Band	FF Back Tension Adjustment (6-5) → FWD Back Tension Adjustment. (6-6)
• Capstan Motor	Pinch Lever Right Angle Adjustment (5-4-4) → Pinch Roller Self-Alignment Adjustment (5-3-3) → Capstan SEARCH x1 Speed Adjustment (9-6) → Capstan SEARCH x1/30 Speed Adjustment (9-7) → Capstan SEARCH x1/15 Speed Adjustment (9-8) → Capstan SEARCH x1/2 Speed Adjustment (9-9) → Capstan FWD and REV Detector Adjustment (9-10) → Capstan Free Speed Adjustment (9-11) → Capstan STOP Servo Adjustment (9-12) → FWD Mode Tape Path Adjustment (2) (7-4) → REV Mode Tape Path Adjustment (7-5) → Tape Path Adjustment Around Pinch Roller (7-6, (7-6-1, 7-6-2)) → 10 Times Picture Search Mode Tape Path Adjustment (7-7) → Video Tracking Adjustment (check). (7-8-1)
• Threading Motor	Gear Box Position Adjustment. (5-3-2)
• Reel Motor	FWD Torque Adjustment (6-3) → REV Torque Adjustment (6-4) → 10 Times Picture Search Mode Speed Adjustment (9-16-1) → Still Speed Adjustment. (9-16-2)

Replacement Parts	Adjustment Items
• CTL. PB Head →	CTL. PB Head Height/Azimuth/Zenith Adjustment → Tracking Adjustment (check). (7-8-2) (7-8-1)
• Audio/CTL Head →	Audio Head Height Adjustment → Audio Head Azimuth Adjustment → Video Tracking (7-8-3) (7-8-5) (7-8-1) Adjustment → Audio Head Height Adjustment → Audio Head Azimuth Adjustment — (7-8-3) (7-8-5) → Audio Head Phase Adjustment → Audio/CTL Head Position Adjustment → Audio (7-8-6) (7-8-7) System Alignment. (10-1 ~ 10-12)
• Drum Assembly →	Brush Position Adjustment → Tracking Adjustment → FF and REW Tape Path Adjustment — (5-10) (7-8, (7-8-1 ~ 7-8-7)) (7-1) → FWD Mode Tape Path Adjustment (2) → REV Mode Tape Path Adjustment → Video (7-4) (7-5) (7-9) Head Dihedral Adjustment → Drum AFC Bias Adjustment → Drum AFC Transient Adjust- (9-13) (9-14) ment → Drum ϕ^2 Adjustment → Switching Position Adjustment → Picture Spliting (9-4) (9-5) (9-15) Compensator Adjustment.
• Upper Drum Assembly →	Upper Drum and Eccentricity Adjustment → Brush Position Adjustment → Tracking Adjust- (4-1) (5-10) (7-8, (7-8-1 ~ ment → FF and REW Tape Path Adjustment → FWD Mode Tape Path Adjustment (2) — 7-8-7)) (7-1) (7-4) → REV Mode Tape Path Adjustment → Video Head Dihedral Adjustment → PB RF (7-5) (7-9) Amplifier Adjustment → Record Amplifier Adjustment. (11-1, (11-1-1 ~ 11-1-7)) (11-6, (11-6-1 ~ 11-6-3))

SECTION 5

LINK AND DRIVE SYSTEM ALIGNMENT

5-1. REEL TABLE SYSTEM ADJUSTMENT

5-1-1. Cassette Holder Position Adjustment

Tool and equipment:

Reel table height check base jig.
Thickness gauge.

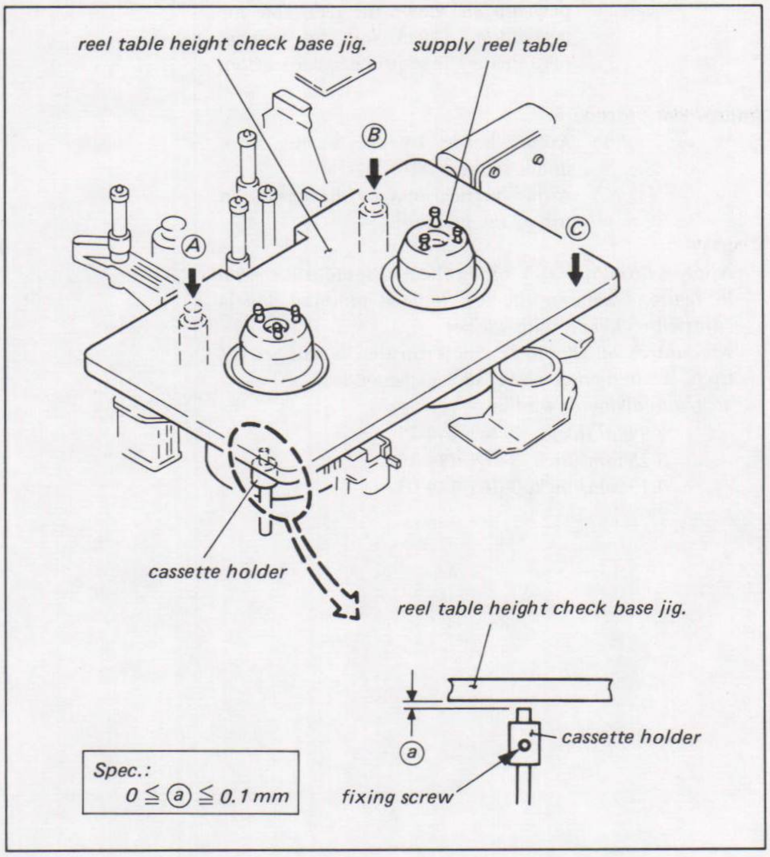
Mode: EJECT completion

Check procedure:

Check that the clearance between the base jig and the cassette holder meets the required specification while pushing lightly the reel table height check base jig marked (A), (B) and (C) toward the chassis.

Adjustment procedure:

Adjust the position of the cassette holder so that meets the required specification.


reel table height check base jig.
supply reel table
Ⓐ
Ⓑ
Ⓒ
cassette holder
reel table height check base jig.
cassette holder
ⓐ
fixing screw

Spec.:
$0 \leq ⓐ \leq 0.1\,mm$

5-1-2. Reel Table Height and Vertical Play Adjustment

- Since the reel table height from the chassis functions as the reference height in the entire tape thread and run system, it is requested that the reel table height adjustment should be attempted carefully, and deliberately.

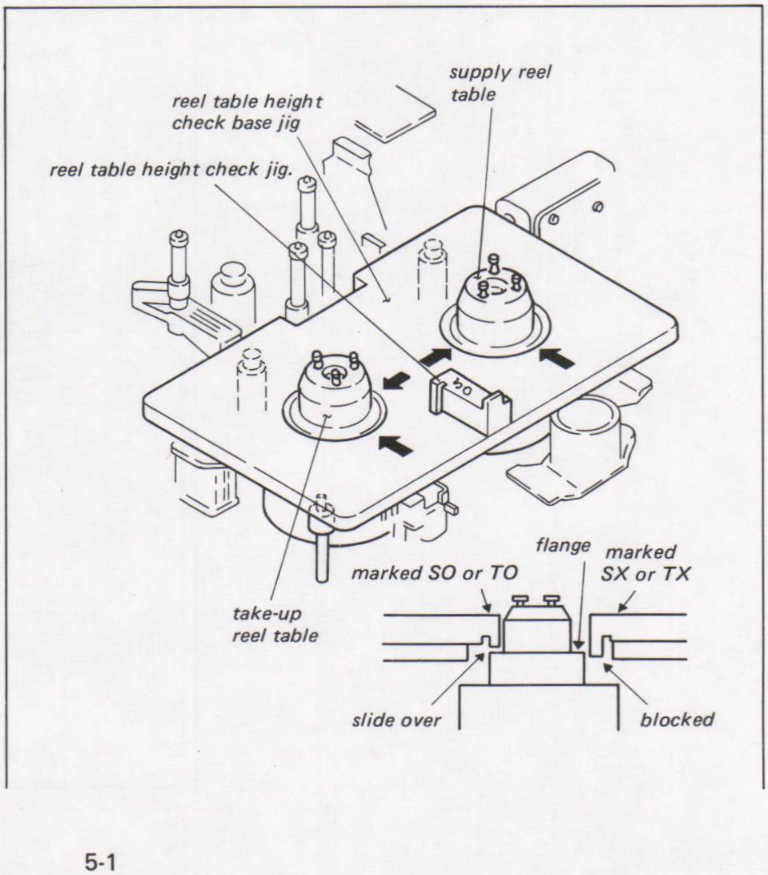
Mode: EJECT completion

Tool and equipment:

Reel table height check base jig.
Reel table height check jig.
Slide vernier callipers or the equivalent.

Check procedure:

(1) The probes of the reel table height check jig marked "SO" and "TO" can slide over the reel table, leaving a space between the jig and the reel table, while the probes marked "SX" and "TX" are blocked, and cannot slide over reel table.
- Use the "SO" and "SX" probes for the supply reel table.
- Use the "TO" and "TX" probes for the take-up reel table.


supply reel table
reel table height check base jig
reel table height check jig.
take-up reel table
flange
marked SO or TO
marked SX or TX
slide over
blocked

(2) Fasten a reel table securing screw, and push up and down the reel table for inspection. Check that the vertical play meets the required specification.

Adjustment procedure:

(1) Adjust height by the washer from under the reel table.
(2) Adjust vertical play by the washer on top of the reel table.

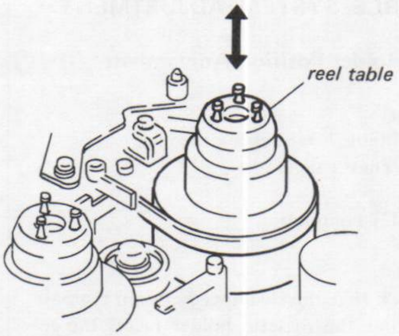
< **NOTE** >

Apply a drop of SONY oil on the reel spindle as shown in figure, whenever the reel table is removed and is adjusted its height with washer.

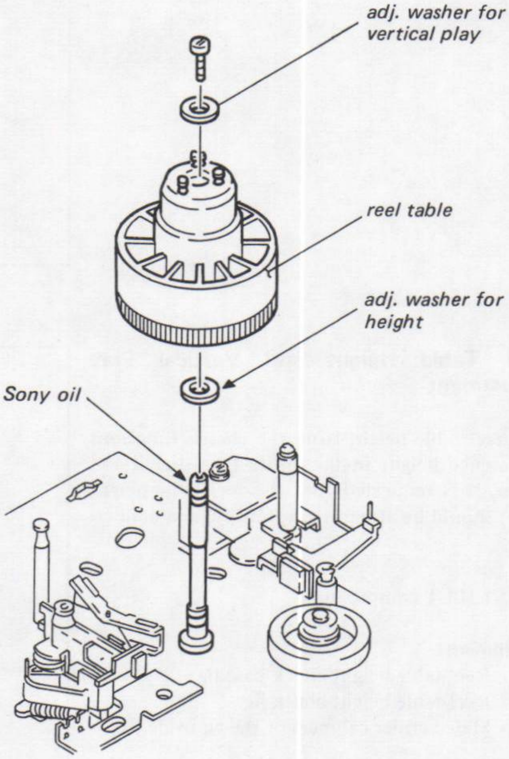
Amount of oil should be one drop that is scooped by tip of 2 mm diameter twig such as pencil lead.

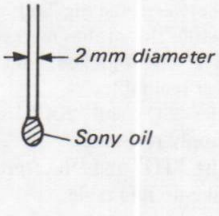
- 6 mm diameter washer

0.5 mm thick,	3-701-444-21
0.25 mm thick,	3-701-444-11
0.13 mm thick,	3-701-444-01



Spec.:
vertical play
0.17 mm ~ 0.38 mm


adj. washer for vertical play
reel table
adj. washer for height
Sony oil


2 mm diameter
Sony oil

5-2. T DRAWER ARM ADJUSTMENT

5-2-1. T Drawer Arm EJECT Position Adjustment

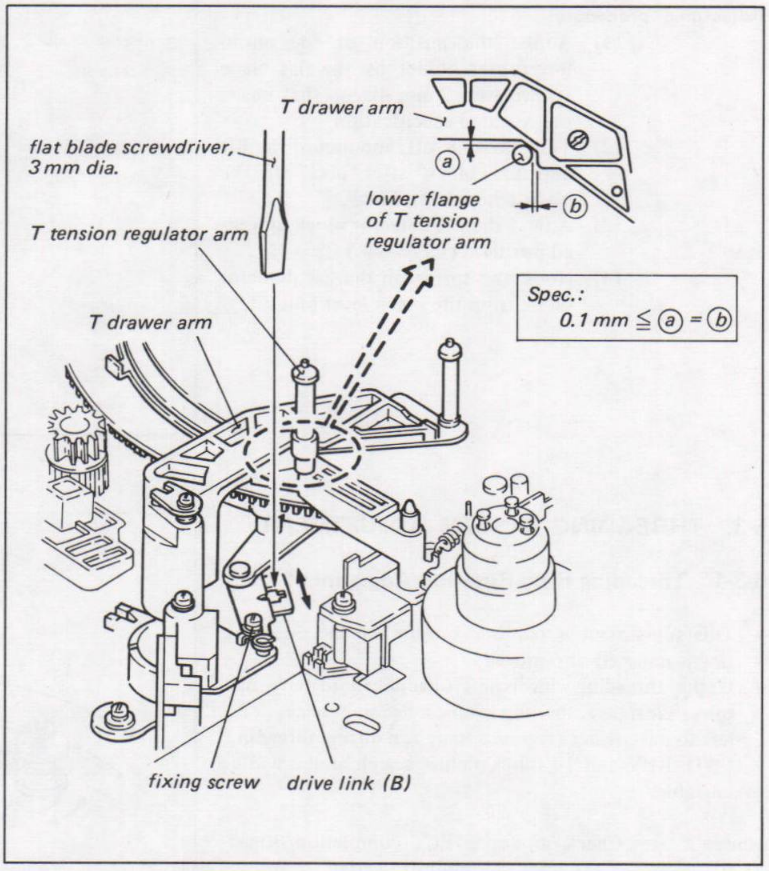
Mode: Setting up FR-STOP mode without cassette tape, and press the EJECT button for setting up EJECT completion state.

Check procedure:

Check that the relationship between the lower flange of T tension regulator arm and the T drawer arm meets the required specification.

Adjustment procedure:

Adjust the position of drive link (B) ass'y by the flat blade screwdriver, 3 mm dia. so that meets the required specification.


T drawer arm
flat blade screwdriver, 3 mm dia.
ⓐ
lower flange of T tension regulator arm
ⓑ
T tension regulator arm
Spec.: 0.1 mm ≦ ⓐ = ⓑ
T drawer arm
fixing screw
drive link (B)

5-2-2. Unthread-end Switch Position Adjustment

Tool and equipment:

Black colored vinyl tape (1 cm × 1.5 cm)

Preparation:

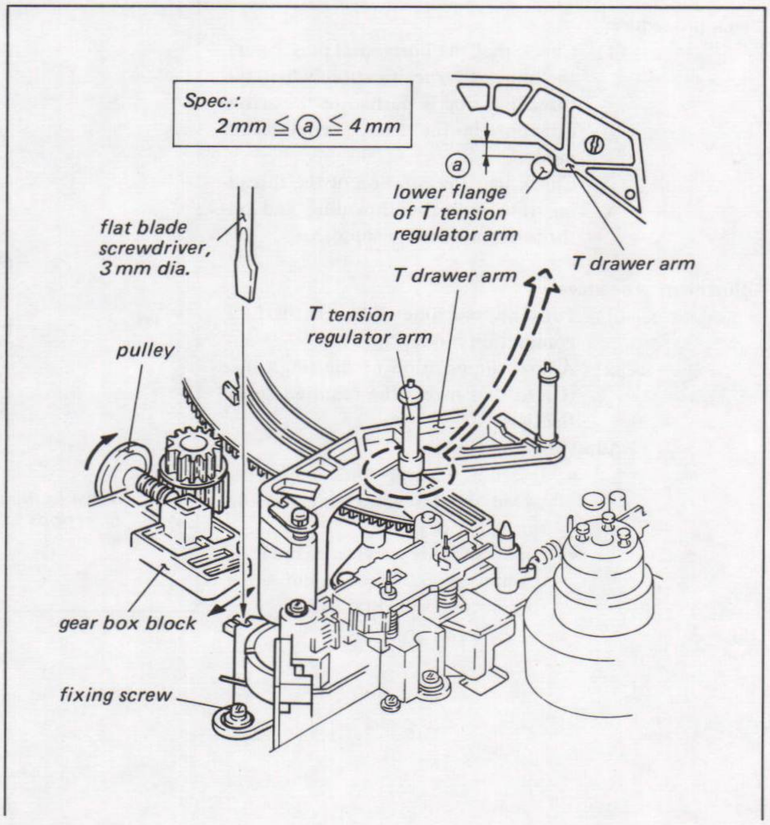
(1) Turn the POWER off in the FR-STOP mode.

(2) Remove the FR detector block, and cover the D2 phote-interrupter (FR-UNTHREAD END Detector) by the black colored vinyl tape.
(Put the FR detector in the FR-STOP mode constantly.)

Check procedure:

(1) Turn POWER on and rotate the pully of gear box block in the clockwise direction with finger.

(2) While the relationship of the T drawer arm and the T tension regulator arm is shown in the figure, check that a energized noise of the take-up brake solenoid is heard in this moment.


Spec.: 2 mm ≦ ⓐ ≦ 4 mm
ⓐ
lower flange of T tension regulator arm
flat blade screwdriver, 3 mm dia.
T drawer arm
T drawer arm
T tension regulator arm
pulley
gear box block
fixing screw

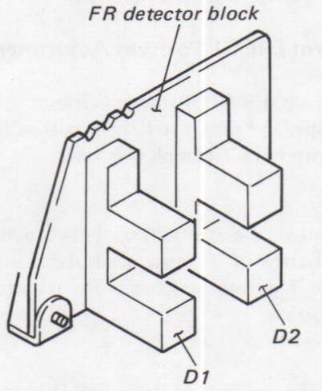
Adjustment procedure:

(1) Adjust the position of the photo interrupter holder by the flat blade screwdriver, 3 mm dia. so that meets the required specification.

(2) Turn POWER off, and mount the FR detector block after peel off the black colored vinyl tape.

(3) Adjust the FR detector block mounted position. (sec. 5-3-4.)

(4) Hook the spring on the FR detector block from the pinch lever block.



5-3. THREADING SYSTEM ADJUSTMENT

5-3-1. Threading Ring Rotation Adjustment

- This adjustment is required only when the threading ring is replaced or removed.
- If the threading ring is left unadjusted to have narrower clearance, the ring rotation becomes heavy, or if left to have wider clearance, tape run during threading, FWD, REV and 10 times picture search modes will be unstable.

Mode: Check mode; EJECT completion/threading/unthreading
Adjustment mode; EJECT completion

Check procedure:

(1) Check that the horizontal play meets the required specification when the threading ring is pushed in the arrow direction in the EJECT completion mode.

(2) Check that the rotation of the threading ring into the threading and unthreading modes are smooth.

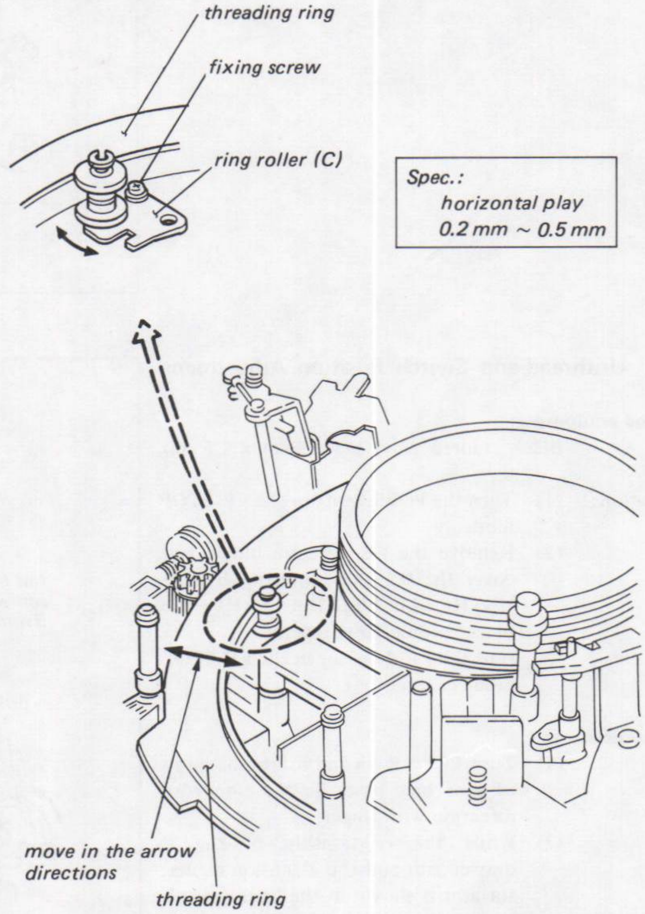
Adjustment procedure:

(1) Put the machine into the EJECT completion mode.

(2) Adjust the position of the ring roller (C) so that meets the required specification.

Adjusting procedure;

- Insert a 0.3 mm thick paper between the threading ring and the ring roller (C).
- Paper of this service manual is 0.1 mm thick so that the three fold becomes 0.3 mm thick.



Spec.:
horizontal play
0.2 mm ~ 0.5 mm

5-3-2. Gear Box Position Adjustment

- It is required that the sec. 5-3-1 threading ring rotation adj. is checked to be correct or properly adjusted before initiating this adjustment.

Mode: After completion of EJECT, turn the pulley 1/2 to 1 revolution in the direction of Arrow C in order to push out the Threading.

Check procedure:

(1) In order to make them easier to see during the Adjustment, mark the two lines on the top surface of the gear with a black felt tip pin.

(2) Turn the pulley so that one of the lines is roughly parallel to the outer circumference of the Threading Ring.

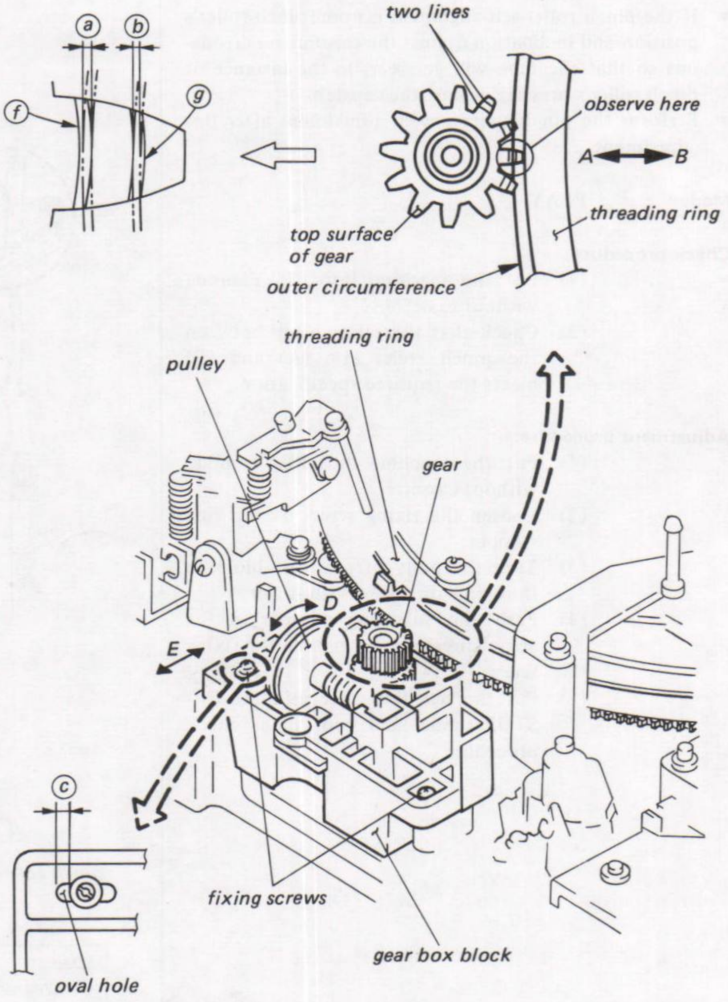
(3) Check to be certain that the relationship between the outer circumference of the Threading Ring and the Gear is within the Specifications.

Adjustment procedure:

(1) With the unit's EJECT completed and the pulley turned 1/2 to 1 revolution (as stated above under MODE), turn the pulley back and forth, as indicated by Arrows C and D, so that the Threading Ring and the Gear engage smoothly.

(2) Adjust the position of the Gear Box by moving it in the direction indicated by Arrow E until it is within the Specifications.

(3) Check the sec. 5-3-1 threading ring rotation adj.



Spec.:

(a) When the Threading Ring is moved in the direction of Arrow A, its outer circumference should be on or touching Line "f".

(b) When the Threading Ring is moved in the direction of Arrow B, its outer circumference should be on or touching Line "g".

(c) An oval hole of 0.1 to 1.5 mm should be visible.

5-3-3. Pinch Roller Self-Alignment Adjustment

- If the pinch roller self-alignment is poor, pinch roller's position and inclination against the capstan are erroneous so that the tape will get sear, in the instance of pinch roller's pressing against the capstan.
- Perform the pinch roller pre-set adjustment after this adjustment.

Mode: PLAY

Check procedure:

(1) Put the machine into PLAY mode without cassette.

(2) Check that the relationship between the pinch roller arm (A) and (B) meets the required specification.

Adjustment procedure:

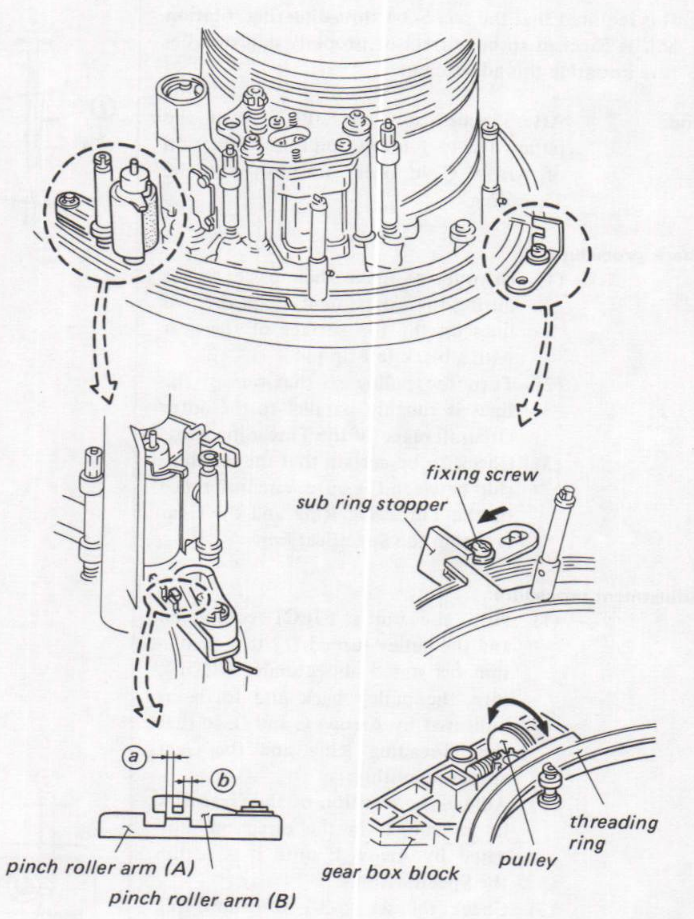
(1) Put the machine into PLAY mode without cassette.

(2) Loosen the fixing screw of sub ring stopper.

(3) Turn the pully of gear box block in the arrow direction with finger.

(4) Push the sub ring stopper in the arrow direction and tighten the fixing screw.

(5) Put the machine once into the FR-STOP mode, and confirm as check procedure.


fixing screw
sub ring stopper
ⓐ
ⓑ
threading ring
pulley
gear box block
pinch roller arm (A)
pinch roller arm (B)

Spec.:
Clearance ⓐ and ⓑ should exist.

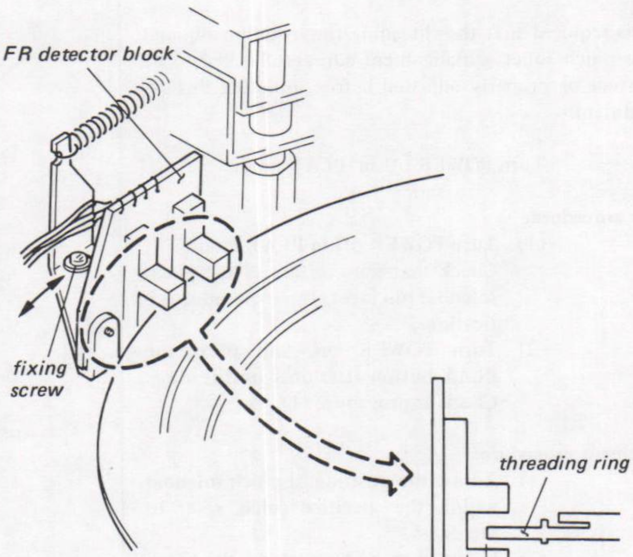
5-3-4. FR Detector Block Mounting Position Adjustment

- It is required that the sec. 5-3-1 threading ring rotation adj. is checked to be correct or properly adjusted before initiating this adjustment.

Mode: Adjustment mode; THREADING completion

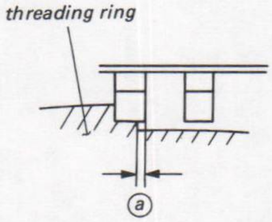
Adjustment procedure:

(1) Put the machine into THREADING completion mode and turn POWER off.
(2) Press the FR detector block against the threading ring, and then return about 1 mm. (Don't return more than 1.5 mm) (Spec. 1)
(3) Adjust the position of the FR detector block in the arrow direction so that meets the required specification 2.
(4) Check that the clearance meets the required specification 1.



Spec. 1:
about 1 mm clearance.

< top view >



Spec. 2:
0 mm ≦ ⓐ ≦ 1 mm

5-4. PINCH LEVER BLOCK ADJUSTMENT

5-4-1. Pinch Lever Pre-set Adjustment

- It is required that the threading ring rotation adj. and the pinch roller self-alignment adj. are checked to be correct or properly adjusted before initiating this adjustment.

Mode: Turn POWER off in PLAY mode.

Check procedure:

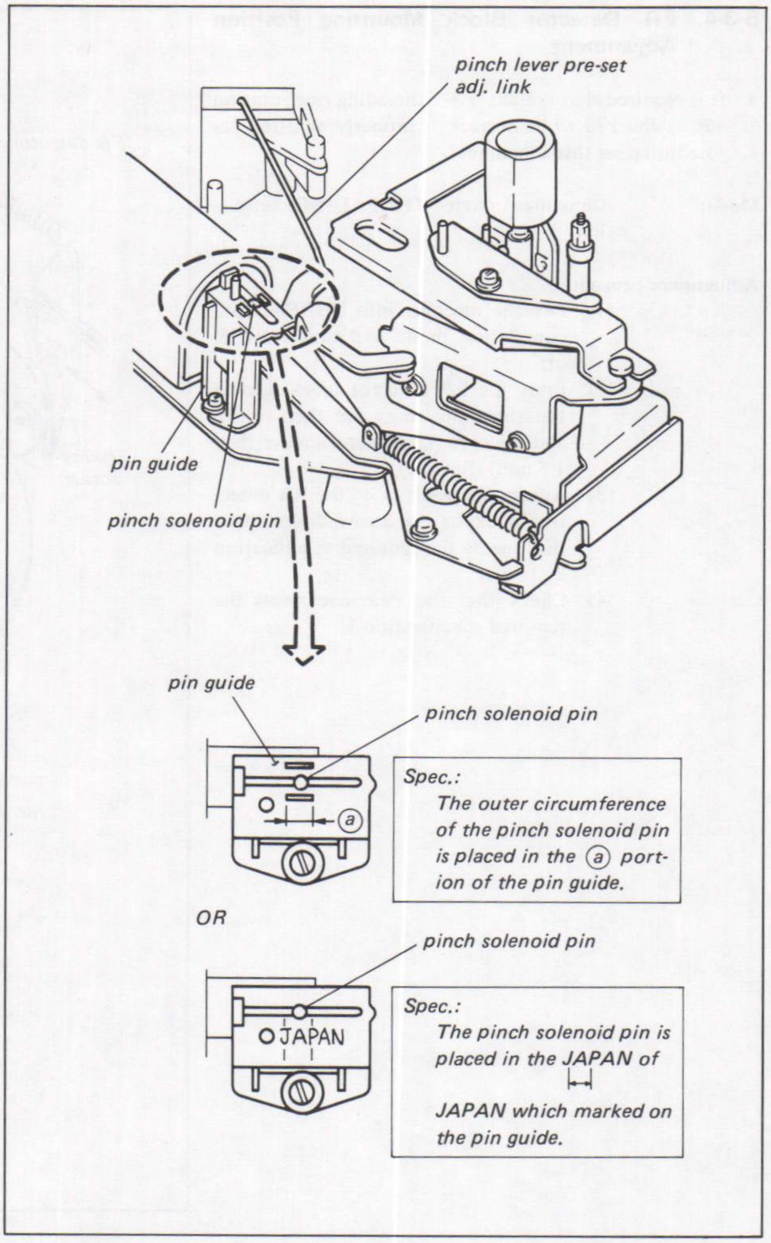
(1) Turn POWER off in PLAY mode. Check that the position of the pinch solenoid pin meets the required specification.

(2) Turn POWER on, and press the PLAY button after once unthreading. Check as procedure (1).

Adjustment procedure:

(1) Adjust the position of pinch solenoid within the specified value, refer to sec. 5-8-5.

(2) If not in step (1), perform the pinch roller self-alignment adjustment within the specified value, refer to sec. 5-3-3.


pinch lever pre-set adj. link
pin guide
pinch solenoid pin
pin guide
pinch solenoid pin
ⓐ
OR
pinch solenoid pin
JAPAN

Spec.:
The outer circumference of the pinch solenoid pin is placed in the ⓐ portion of the pin guide.

Spec.:
The pinch solenoid pin is placed in the JAPAN of JAPAN which marked on the pin guide.

5-4-2. Pinch Roller Pre-set Adjustment

- It is required that the threading ring rotation adj. and the pinch roller self-alignment adj. are checked to be correct or properly adjusted before proceeding this adjustment.

Mode: Turn POWER off in PLAY mode.

Tool and equipment:
Thickness gauge

Check procedure:

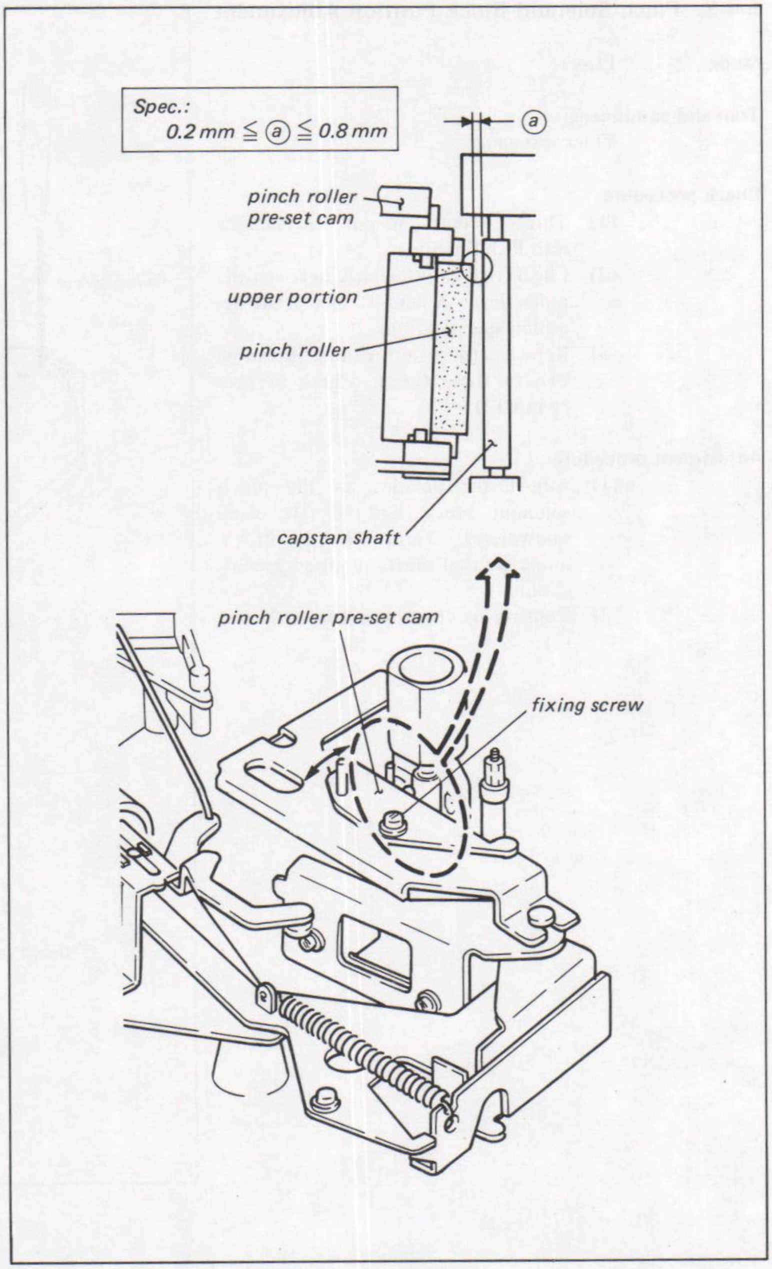
(1) Turn POWER off in PLAY mode. Check that the clearance between the upper portion of pinch roller and the capstan shaft meets the required specification.

(2) Turn POWER on, and press the PLAY button after once unthreading. Check as procedure (1).

Adjustment procedure:

(1) Turn POWER off. Move the position of the pre-set cam in the arrow direction so that meets the required specification.

(2) Confirm as check procedure in this step.


Spec.:
0.2 mm ≦ ⓐ ≦ 0.8 mm
ⓐ
pinch roller pre-set cam
upper portion
pinch roller
capstan shaft
pinch roller pre-set cam
fixing screw

5-4-3. Pinch Solenoid Block Position Adjustment

Mode: PLAY

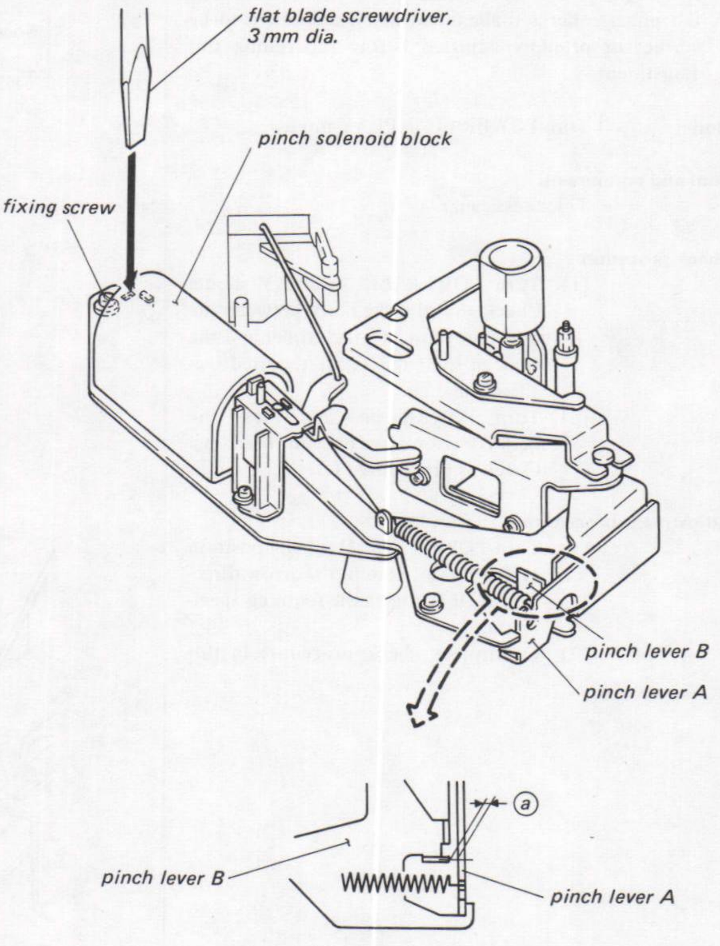
Tool and equipment:
Thickness gauge

Check procedure:

(1) Thread a tape and put the machine into PLAY mode.
(2) Check that the clearance between the pinch lever A and B meets the required specification.
(3) Repeat the unthreading/threading two or three times. Check as procedure (2).

Adjustment procedure:

(1) Adjust the position of the pinch solenoid block by the flat blade screwdriver, 3 mm dia. in PLAY mode so that meets required specification.
(2) Confirm as check procedure (2) and (3).


flat blade screwdriver,
3 mm dia.
pinch solenoid block
fixing screw
pinch lever B
pinch lever A
ⓐ
pinch lever B
pinch lever A

Spec.:
0.2 mm ≦ ⓐ ≦ 0.5 mm

5-5. T TAPE SENSOR POSITION ADJUSTMENT

- There are two adjustments of the height and the clearance between a tape and LED in this section.

Mode: Thread a tape and put the machine into FR-STOP and PAUSE modes.

Tool and equipment:

Thickness gauge

Check procedure:

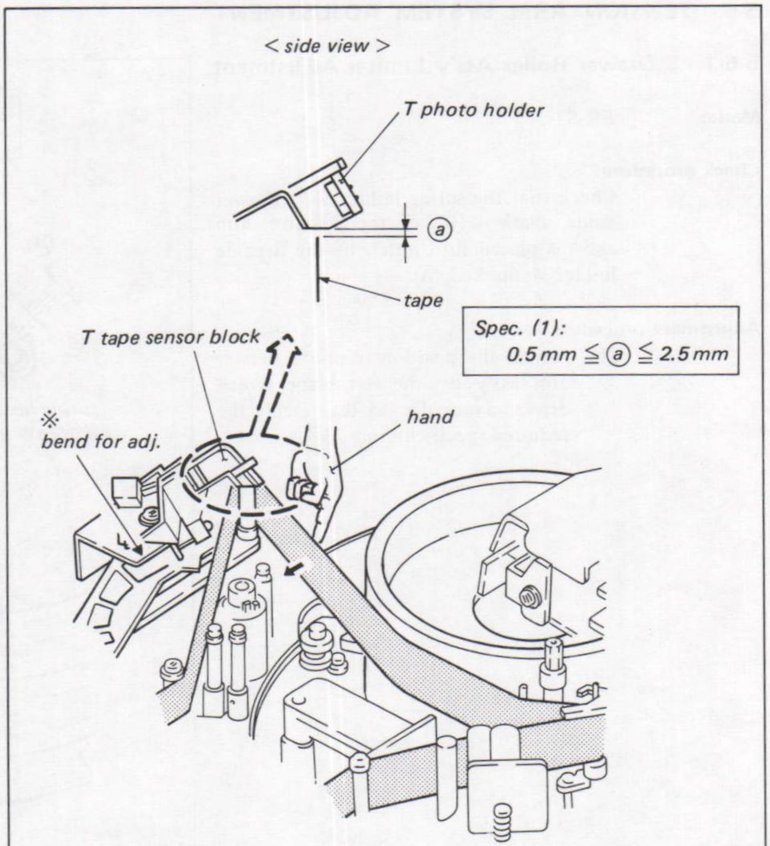
(1) Thread a tape and put the machine into FR-STOP mode. Push the tape against the cassette tape side with finger as shown in figure. Check that the clearance between the upper edge of a tape and the under side of T photo holder block (black colored plastic) meets the required specification (Spec. (1)).

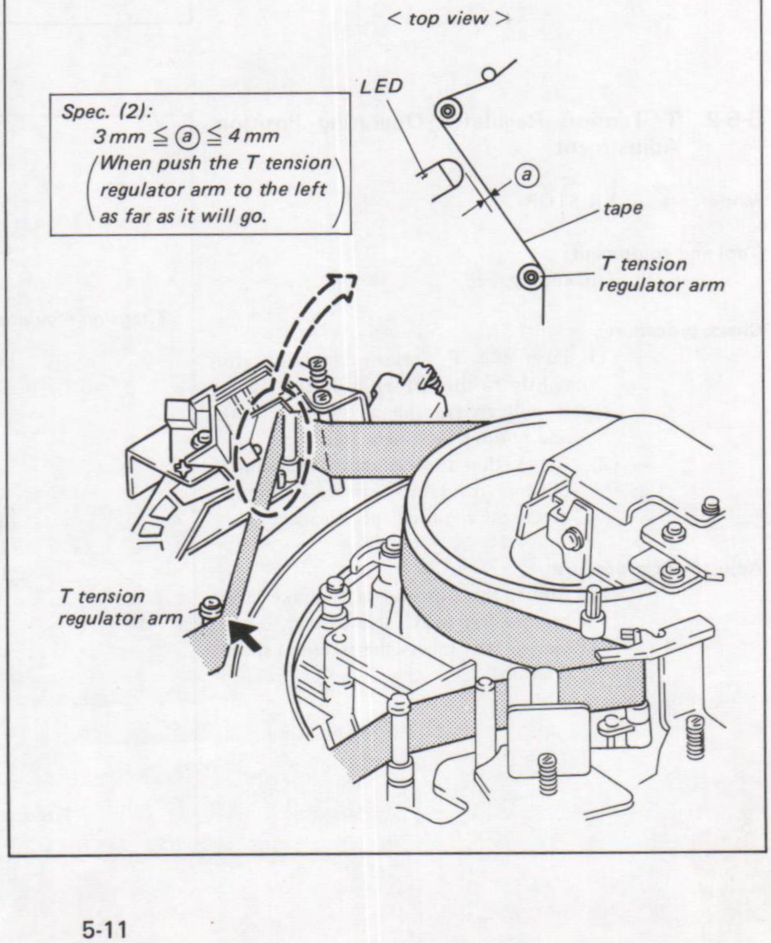
(2) Put the machine into PAUSE mode. Push the T tension regulator arm to the left as far as it will go. On the T tape sensor block, check that the clearance between the video tape and the tip of LED meets the required specification (Spec. (2)).

Adjustment procedure:

(1) Bend the ※ marked position in figure with pliers so that meets the required specification. Confirm as check procedure (2).

(2) Adjust the position of the T tape sensor block by the flat blade screwdriver, 3 mm dia. so that meets the required specification (2).


< side view >
T photo holder
ⓐ
tape
Spec. (1):
0.5 mm ≦ ⓐ ≦ 2.5 mm
T tape sensor block
hand
※
bend for adj.


< top view >
LED
Spec. (2):
3 mm ≦ ⓐ ≦ 4 mm
(When push the T tension regulator arm to the left as far as it will go.)
ⓐ
tape
T tension regulator arm
T tension regulator arm

5-6. TENSION ARM SYSTEM ADJUSTMENT

5-6-1. S Drawer Roller Ass'y Limiter Adjustment

Mode: FR-STOP

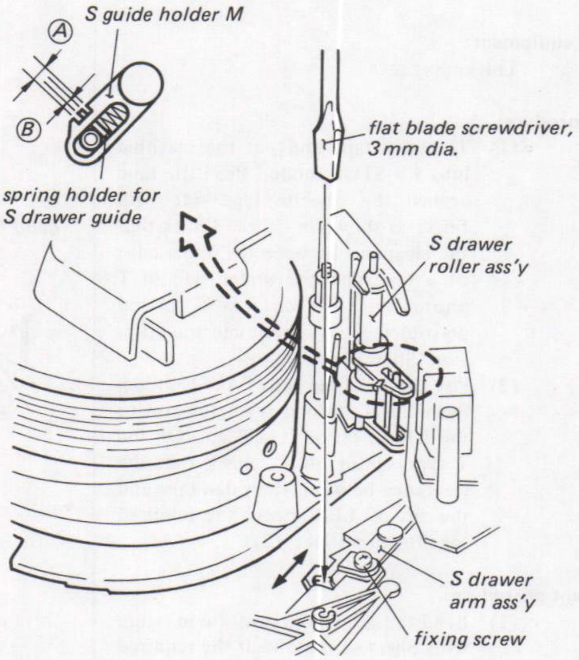
Check procedure:

Check that the spring holder for S drawer guide, marked Ⓑ, of the S drawer arm ass'y is placed into notch of the S guide holder M, marked Ⓐ.

Adjustment procedure:

(1) Adjust the position of the S drawer arm ass'y by the flat blade screwdriver, 3 mm dia. so that meets the required specification.

Spec.:
Projection Ⓑ is placed into the notch Ⓐ.


Ⓐ
S guide holder M
Ⓑ
flat blade screwdriver, 3 mm dia.
spring holder for S drawer guide
S drawer roller ass'y
S drawer arm ass'y
fixing screw

5-6-2. T Tension Regulator Operating Position Adjustment

Mode: FR-STOP

Tool and equipment:

Thickness gauge

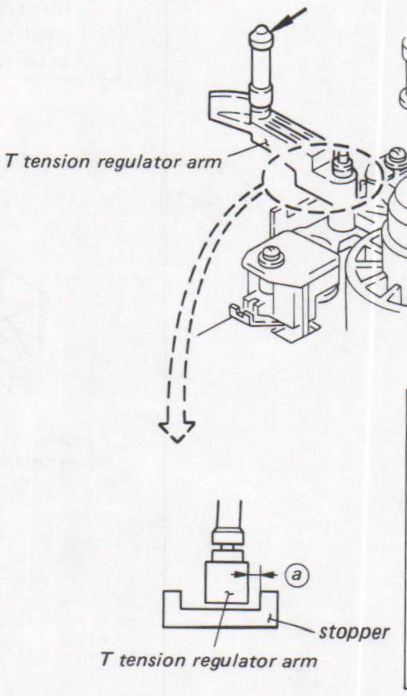
Check procedure:

(1) Push the T tension regulator arm lightly to the left with finger as far as it will go (in the arrow direction), and remove the finger gently.

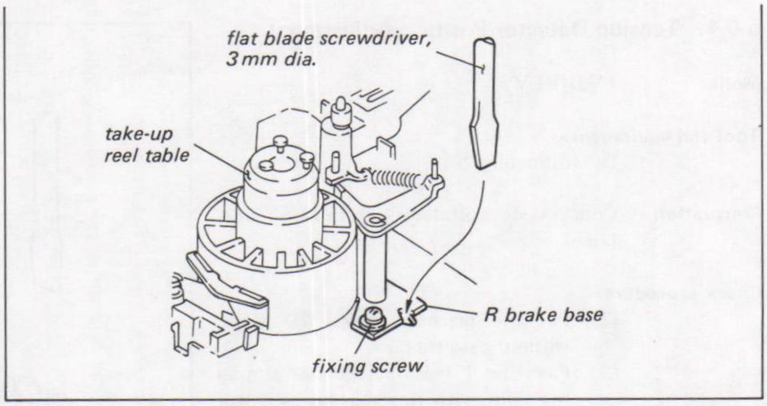
(2) Check that the clearance between T tension regulator arm and stopper meets the required specification.

Adjustment procedure:

(1) Adjust the position of R brake lever by the flat blade screwdriver, 3 mm dia. so that meets the required specification.


T tension regulator arm
ⓐ
stopper
T tension regulator arm

Spec.:
- *USA MODEL S/N 10001 ~ 10040*
  CND MODEL S/N 20001 ~ 20010
  1.2 mm ≦ ⓐ ≦ 1.8 mm
- *USA MODEL 10041 AND LATER*
  CND MODEL 20011 AND LATER
  0.2 mm ≦ ⓐ ≦ 0.8 mm


flat blade screwdriver,
3 mm dia.
take-up
reel table
R brake base
fixing screw

5-6-3. S Tension Regulator Operating Position Adjustment

Mode: FF

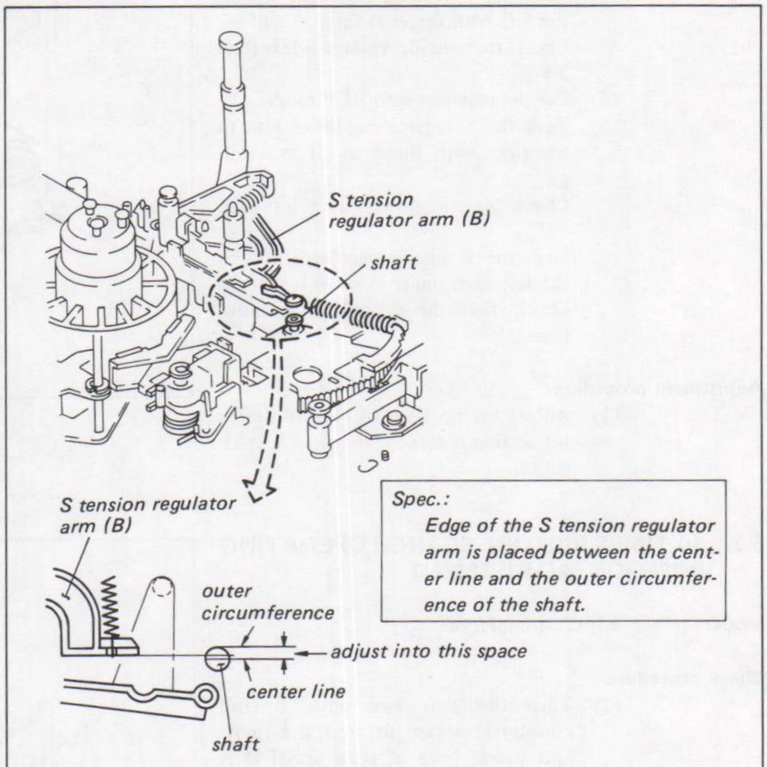
Check procedure:

(1) Put the machine into FF mode without cassette tape.

(2) Check that the edge of S tension regulator arm (B) meets the required specification.

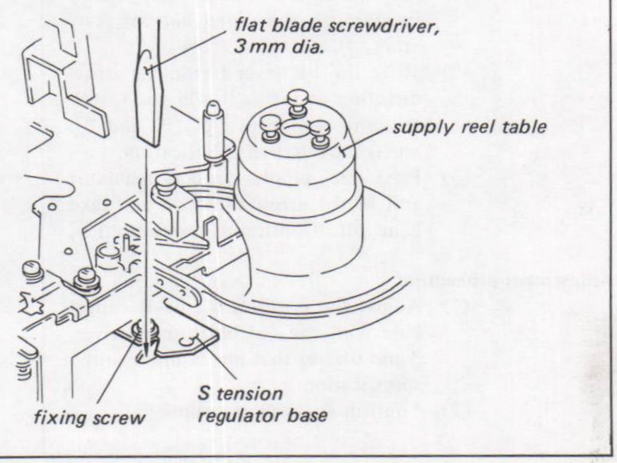
Adjustment procedure:

(1) Adjust the position of S tension regulator base so that meets the required specification.


S tension
regulator arm (B)
shaft
B
S tension regulator
arm (B)
outer
circumference
adjust into this space
center line
shaft

Spec.:

Edge of the S tension regulator arm is placed between the center line and the outer circumference of the shaft.


flat blade screwdriver,
3 mm dia.
supply reel table
fixing screw
S tension
regulator base

5-6-4. Tension Detector Position Adjustment

Mode: FWD/REV

Tool and equipment:
DC voltmeter

Preparation: Connect dc voltmeter to TP17/SY-68A board.

Check procedure:

(1) Put the machine into FWD mode without cassette tape.

(2) Push the T tension regulator arm to the right with finger as far as it will go. Check that the dc voltage is more than 9 V.

(3) Push the T tension regulator arm to the left with finger as far as it will go. Check that the dc voltage is less than 2 V.

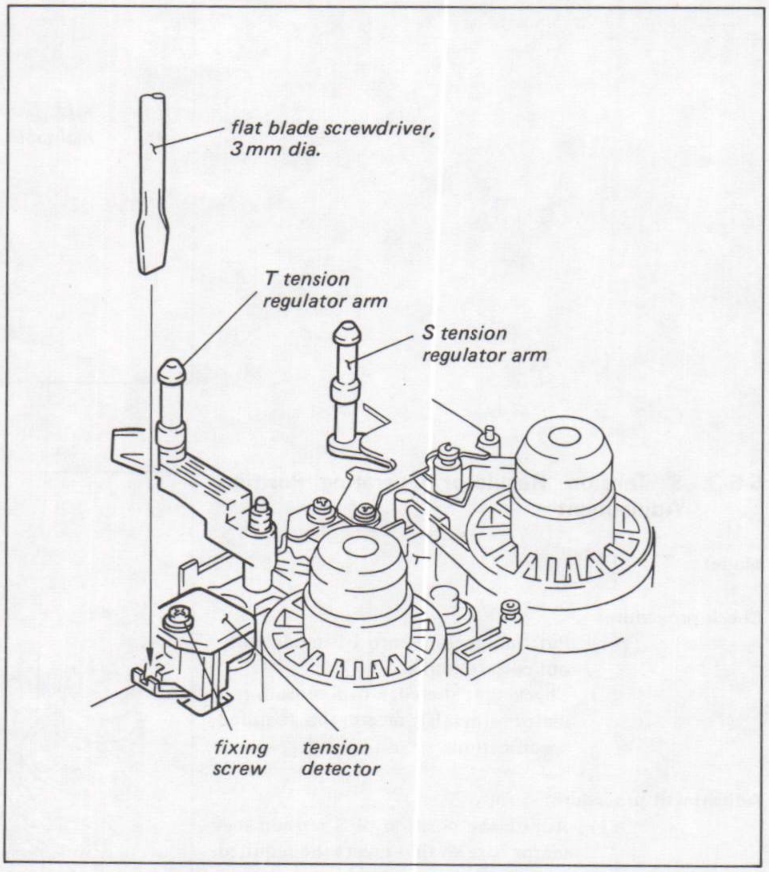
(4) Put the machine into REV mode.

(5) Push the S tension regulator arm to the right with finger as far as it will go.
Check that the dc voltage is less than 2 V.

(6) Push the S tension regulator arm to the left with finger as far as it will go. Check that the dc voltage is more than 9 V.

Adjustment procedure:

(1) Adjust the position of tension detector so that meets the required specification.



5-7. 10 TIMES PICTURE SEARCH OPERATING POSITION ADJUSTMENT

Mode: EJECT completion

Check procedure:

(1) Turn the gear box pully to the counterclockwise so that the right-end round hole of skew arm (A) is placed to the just above the shaft on the chassis as shown in figure (viewing through the round hole of skew arm (A)).

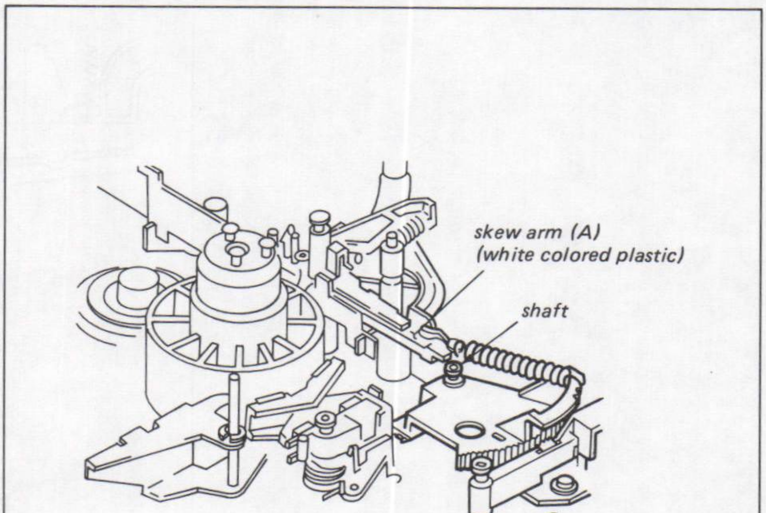
(2) Move the FR lever (A) in the arrow direction as far as it will go. Check that the clearances Ⓐ, Ⓑ and Ⓒ meets the required specification.

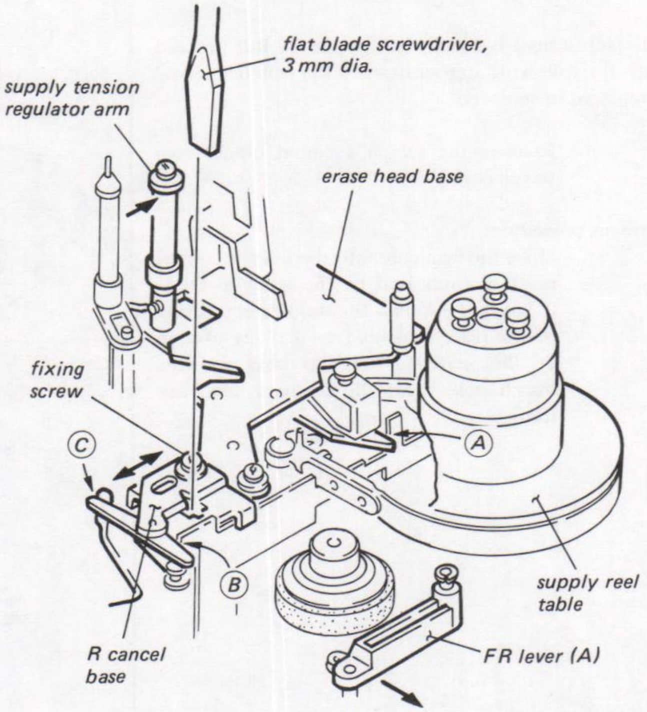
(3) Press the supply tension regulator arm in the arrow direction and take hand off. Confirm as procedure (2).

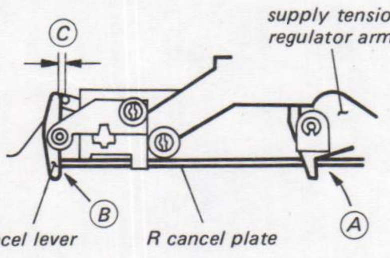
Adjustment procedure:

(1) Adjust the position of the R cancel base with the flat blade screwdriver, 3 mm dia. so that meets the required specification.

(2) Confirm as check procedure (3).




flat blade screwdriver,
3 mm dia.
supply tension
regulator arm
erase head base
fixing
screw
Ⓒ
Ⓐ
Ⓑ
supply reel
table
R cancel
base
FR lever (A)


Ⓒ
supply tension
regulator arm A
Ⓑ
R cancel lever
R cancel plate
Ⓐ

Spec.:

Ⓐ Ⓑ : There are no clearances.

0.1 mm ≦ ⓒ ≦ 0.5 mm

5-8. SOLENOID SYSTEM ADJUSTMENT

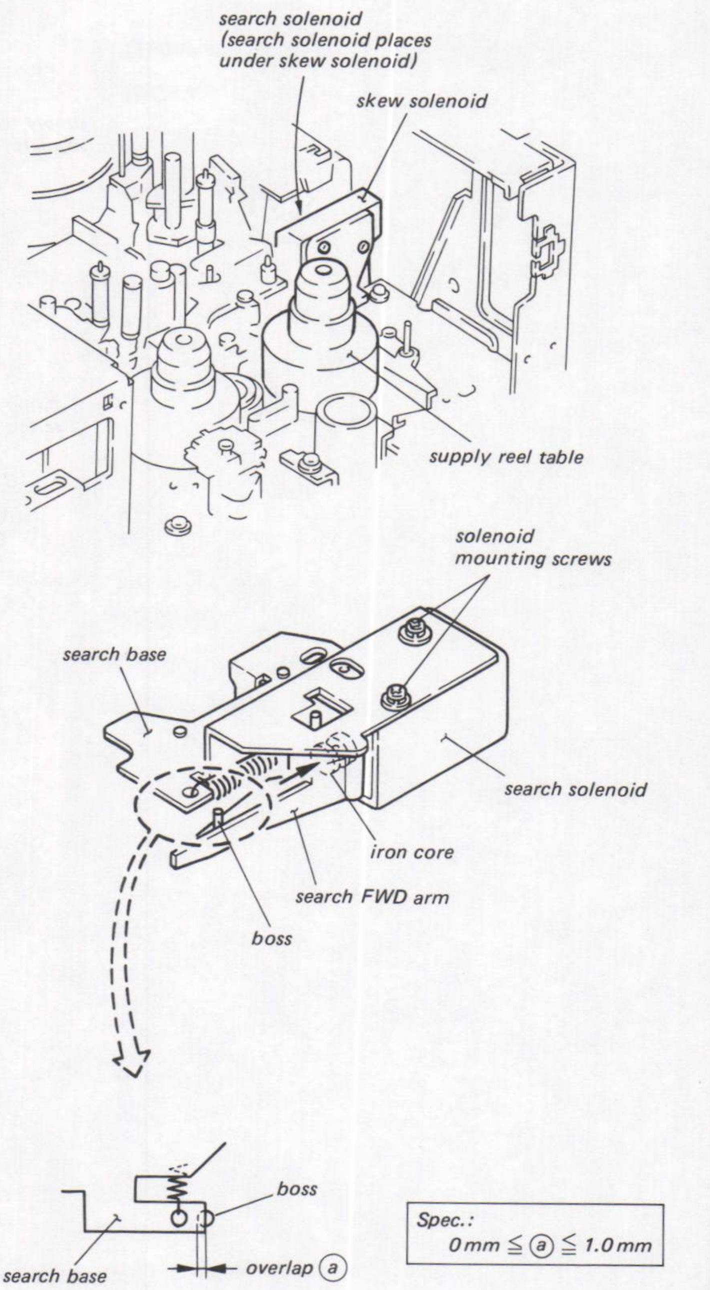
5-8-1. Search Solenoid Mounting Position Adjustment

- This adjustment is usually not required. But proceed with the following step only when the search solenoid is replaced or removed.

Mode: Remove the search solenoid block from the chassis.

Adjustment procedure:

Move the iron core into the fully energized position (indicated by the arrow as far as it will go). Adjust the mounting position of the search solenoid so that the overlap of the search FWD arm boss and the search base meet the required specification.


search solenoid
(search solenoid places
under skew solenoid)
skew solenoid
supply reel table
solenoid
mounting screws
search base
search solenoid
iron core
search FWD arm
boss
boss
search base
overlap ⓐ

Spec.:
0mm ≦ ⓐ ≦ 1.0mm

5-8-2. Skew Solenoid Mounting Position Adjustment

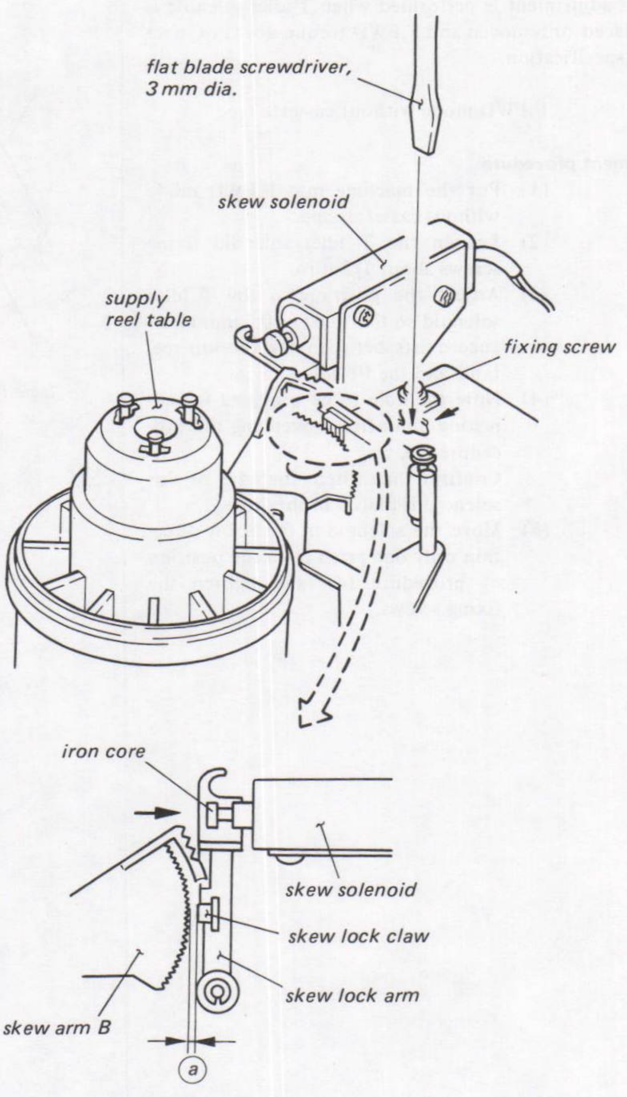
Mode: EJECT completion

Check procedure:

Check that the clearance between the skew lock claw and the skew arm B meets the required specification when the skew solenoid iron core is push in the arrow direction.

Adjustment procedure:

Adjust the position of the skew solenoid with a flat blade screwdriver, 3 mm dia. so that meets the required specification.


flat blade screwdriver, 3 mm dia.
skew solenoid
supply reel table
fixing screw
iron core
skew solenoid
skew lock claw
skew lock arm
skew arm B
ⓐ

Spec.:
$0.2\,\text{mm} \leqq ⓐ \leqq 0.5\,\text{mm}$

5-8-3. T Idler Solenoid Position Adjustment

- This adjustment is performed when T idler solenoid is replaced or removed and F.FWD torque does not meet the specification.

Mode: F.FWD mode without cassette tape

Adjustment procedure:

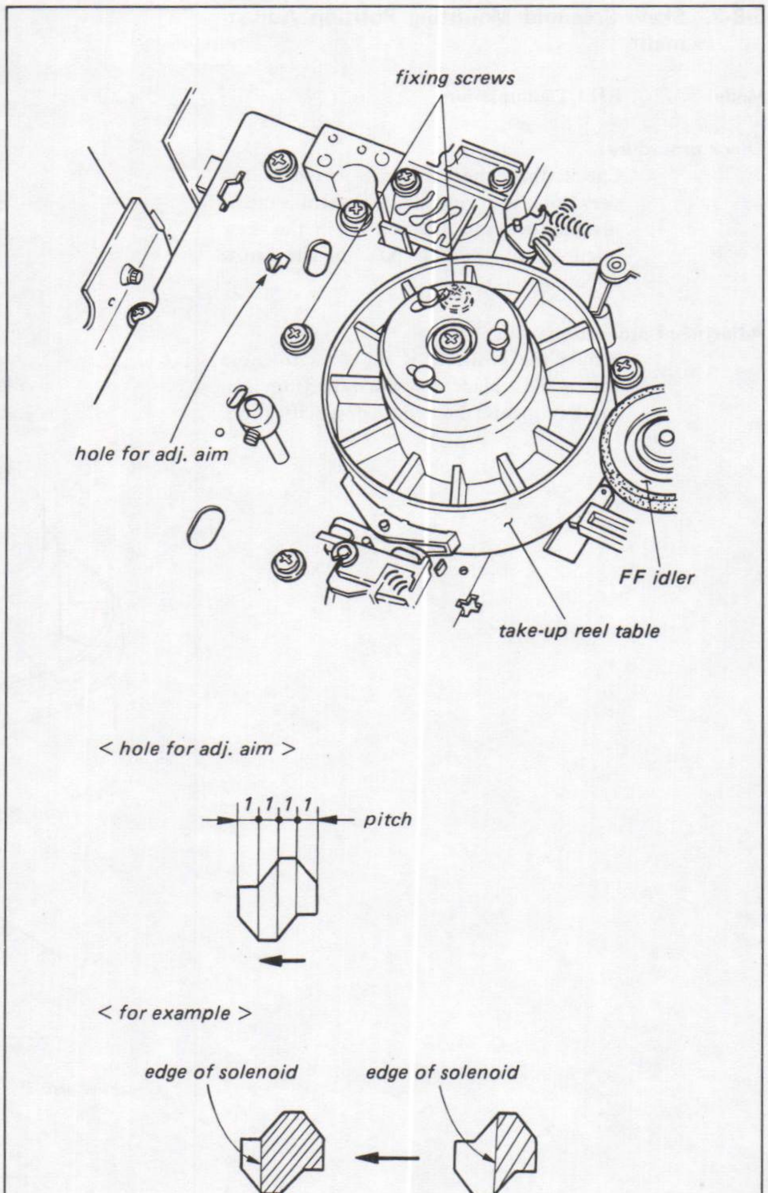
(1) Put the machine into F.FWD mode without cassette tape.

(2) Loosen the T idler solenoid fixing screws about 1/2 turn.

(3) Adjust the position of the T idler solenoid so that 0.01 ~ 0.1 mm clearance exists between the take-up reel table and the FF idler.

(4) Note the hole to be provided for adjusting aim after proceeding the procedure (3).
Confirm that where the edge of this solenoid is placed in this hole.

(5) Move the solenoid in the arrow direction only one pitch from the position of procedure (4), and tighten the fixing screws.


fixing screws
hole for adj. aim
FF idler
take-up reel table
< hole for adj. aim >
1 1 1 1
pitch
< for example >
edge of solenoid
edge of solenoid

5-8-4. S Idler Solenoid Position Adjustment

- This adjustment is required only when the supply idler solenoid is replaced or removed and the REW torque does not meet the specification.

Mode: REW mode without cassette tape

Adjustment procedure:

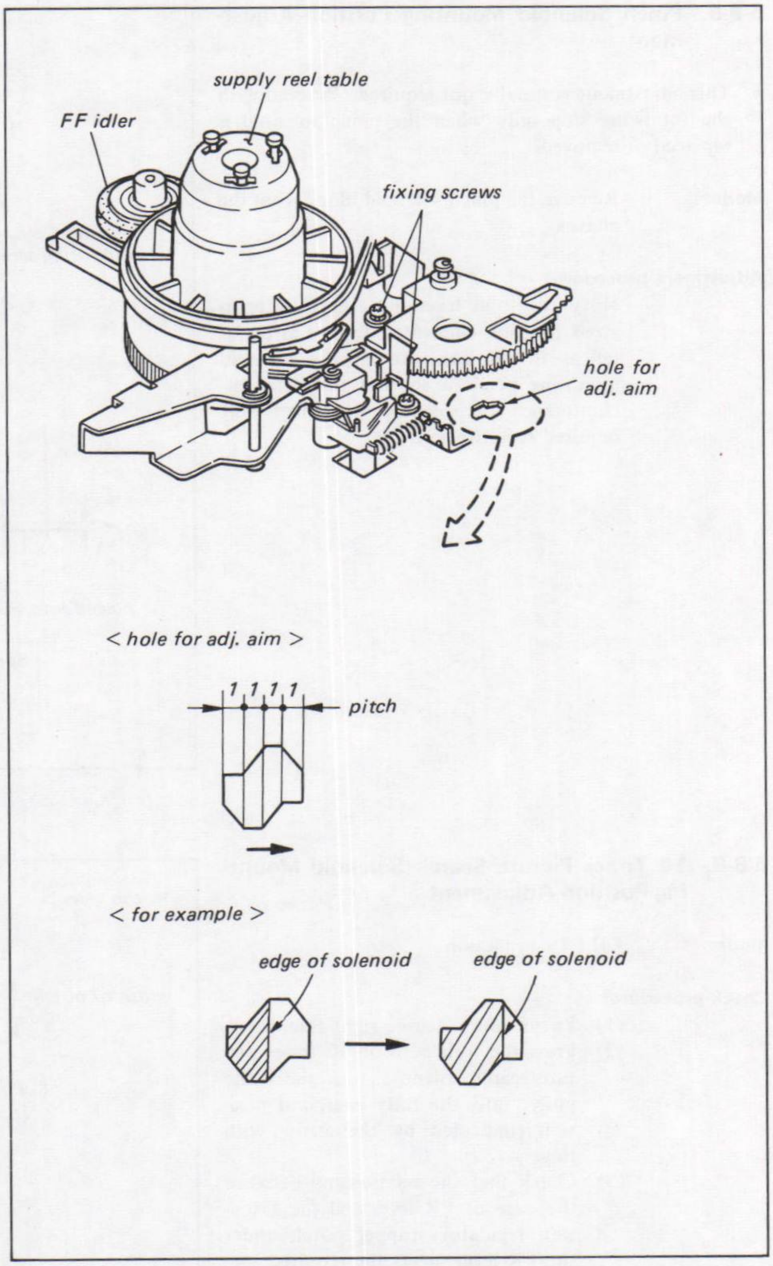
(1) Put the machine into REW mode without cassette tape.

(2) Loosen the supply idler solenoid fixing screws about 1/2 turn.

(3) Adjust the position of the S idler solenoid so that 0.01 ~ 0.1 mm clearance exists between the supply reel table and the FF idler.

(4) Note the hole to be provided for adjusting aim after proceeding the procedure (3).
Confirm that where the edge of this solenoid is placed in this hole.

(5) Move the solenoid in the arrow direction only one pitch from the position of procedure (4). Tighten fixing screws.


supply reel table
FF idler
fixing screws
hole for adj. aim
< hole for adj. aim >
1 1 1 1
pitch
< for example >
edge of solenoid
edge of solenoid

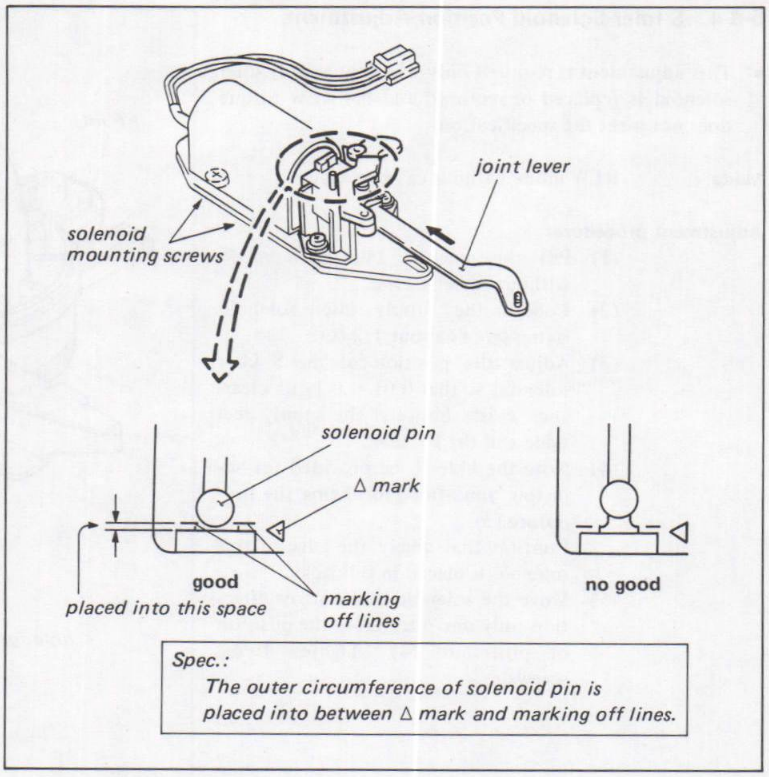
5-8-5. Pinch Solenoid Mounting Position Adjustment

- This adjustment is usually not required. Proceed with the following step only when the pinch solenoid is replaced or removed.

Mode: Remove the pinch solenoid block from the chassis.

Adjustment procedure:

Move the joint lever into the fully energized position (indicated by the arrow as far as it will go). Adjust the solenoid mounting position so that the outer circumference of solenoid pin meets the required specification.


joint lever
solenoid mounting screws
solenoid pin
Δ mark
good
placed into this space
marking off lines
no good

Spec.:
The outer circumference of solenoid pin is placed into between Δ mark and marking off lines.

5-8-6. 10 Times Picture Search Solenoid Mounting Position Adjustment

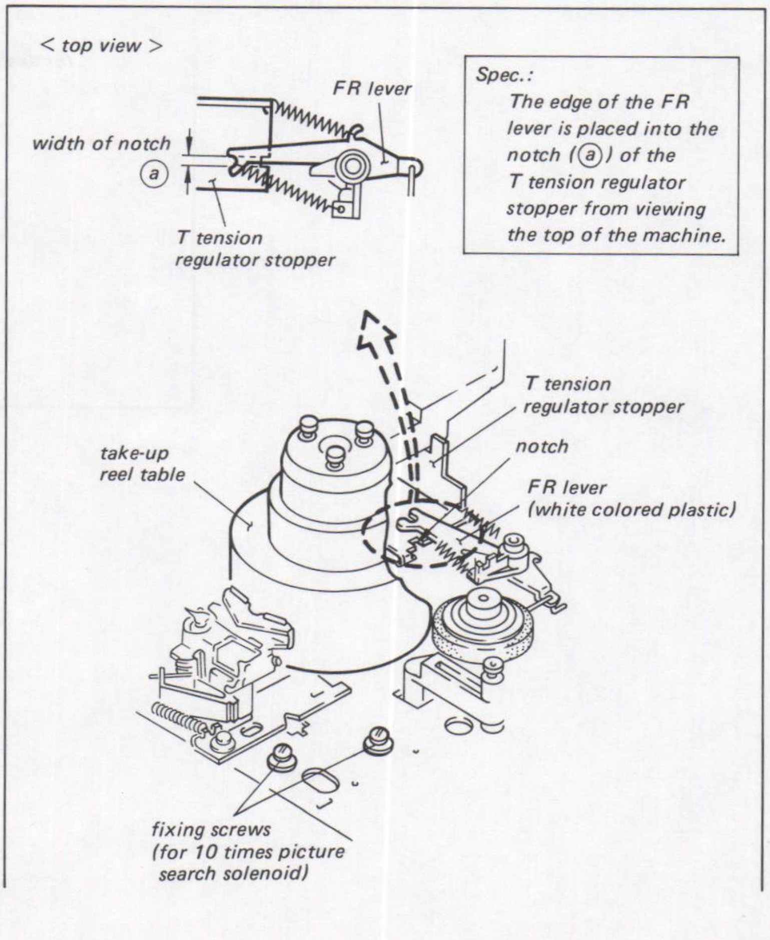
Mode: EJECT completion

Check procedure:

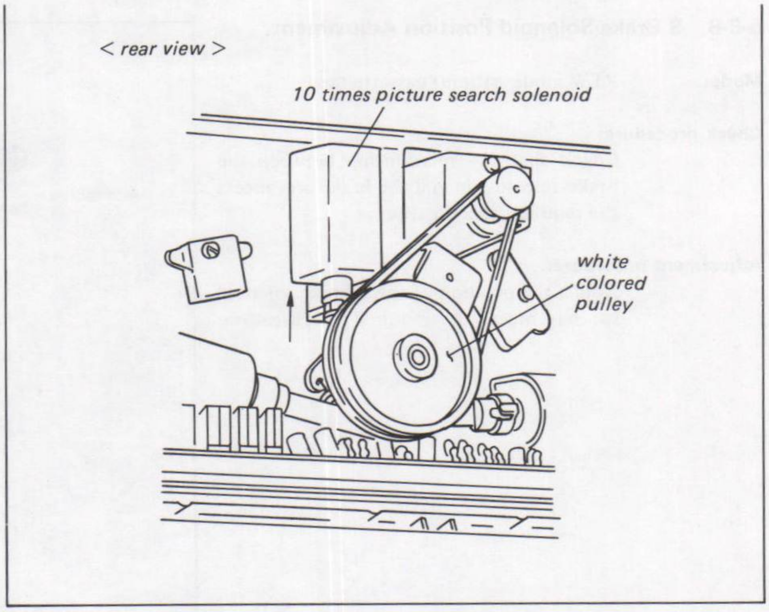
(1) Put on the machine right side down.
(2) Press the iron core of 10 times picture search solenoid, near the white pully, into the fully energized position (indicated by the arrow with finger).
(3) Check that the relationship between the edge of FR lever and the T tension regulator stopper notch under the FR lever meets the required specification.

Adjustment procedure:

(1) Adjust the position of the 10 times picture search solenoid so that meets the required specification.


< top view >
FR lever
width of notch
ⓐ
T tension regulator stopper
T tension regulator stopper
notch
FR lever (white colored plastic)
take-up reel table
fixing screws (for 10 times picture search solenoid)

Spec.:
The edge of the FR lever is placed into the notch (ⓐ) of the T tension regulator stopper from viewing the top of the machine.


< rear view >
10 times picture search solenoid
white colored pulley

5-8-7. T Brake Solenoid Position Adjustment

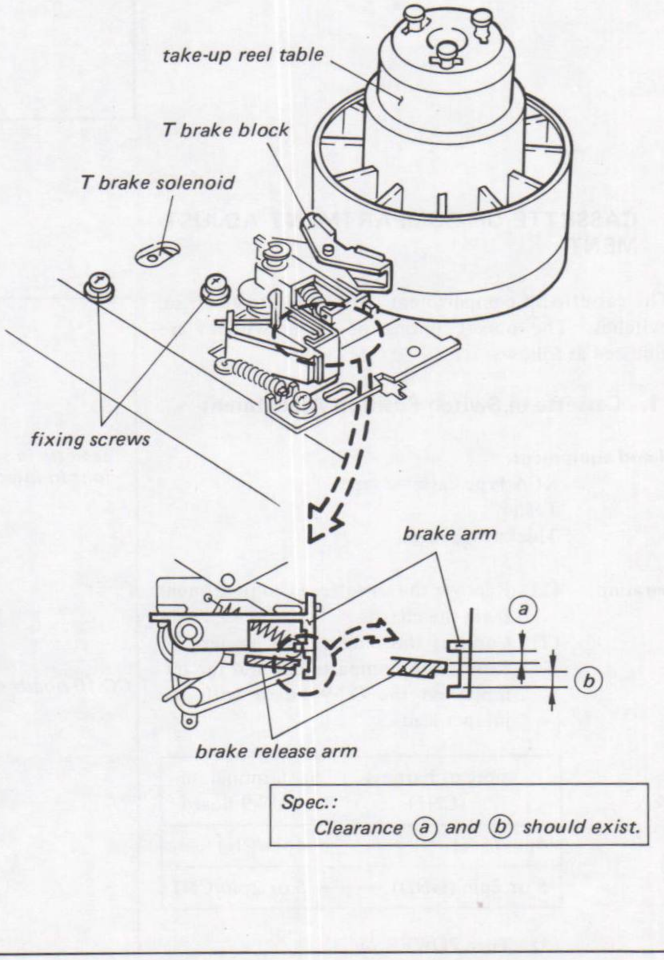
Mode: REW mode without cassette tape

Check procedure:

Check that the relationship between the brake release arm and the brake arm meets the required specification.

Adjustment procedure:

Adjust the position of the T brake solenoid so that meets the required specification.


take-up reel table
T brake block
T brake solenoid
fixing screws
brake arm
ⓐ
ⓑ
brake release arm

Spec.:
Clearance ⓐ and ⓑ should exist.

5-8-8. S Brake Solenoid Position Adjustment

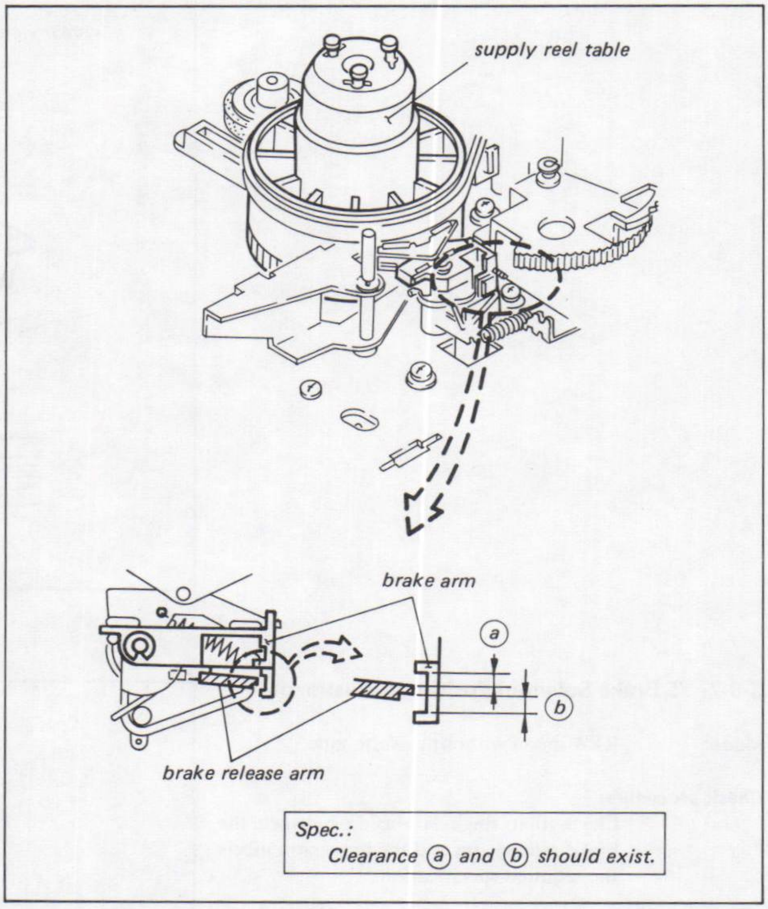
Mode: REW mode without cassette tape

Check procedure:

Check that the relationship between the brake release arm and the brake arm meets the required specification.

Adjustment procedure:

Adjust the position of the S brake solenoid so that meets the required specification.


supply reel table
brake arm
ⓐ
ⓑ
brake release arm

Spec.:
Clearance ⓐ and ⓑ should exist.

5-9. CASSETTE-UP COMPARTMENT ADJUSTMENT

- The cassette-up compartment has two photo-electrical switches. The on/off timing of these switches are adjusted as follows.

5-9-1. Cassette-in Switch Position Adjustment

Tool and equipment:

KCA type cassette tape.
Tester.
Thickness gauge.

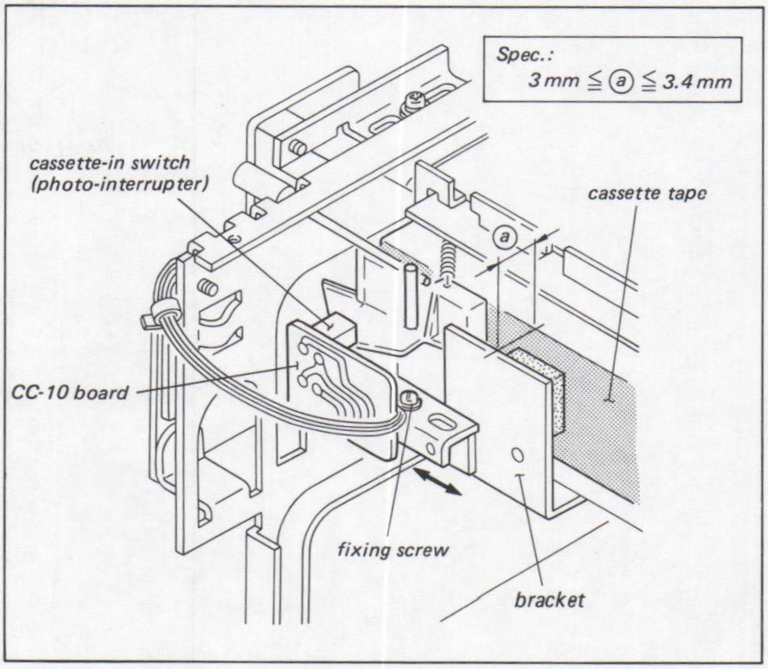
Preparation:

(1) Remove the cassette-up compartment from the chassis.

(2) Connect the plug of the harness for cassette-up compartment and the terminal on the CC-9 board with the jumper leads.

plug of harness (CN1)	terminal on CC-9 board
4pin (5 V) ⟵⟶	4pin/CN1
5 or 2pin (GND) ⟵⟶	5 or 2pin/CN1

(3) Turn POWER on.


cassette-in switch
(photo-interrupter)
cassette tapc
ⓐ
CC-10 board
fixing screw
bracket

Spec.:
3 mm ≦ ⓐ ≦ 3.4 mm

Check procedure:

(1) Connect the tester to ② terminal on CC-9 board.
(2) Insert a KCA type cassette tape slowly.
(3) Check that the clearance between the front side of the cassette tape and the bracket of cassette-up compartment meets the required specification when the tester is turned "H" level (about 5 V).

Adjustment procedure:

(1) Adjust the position of the cassette-in switch in the arrow direction so that meets the required specification.

Adjusting procedure;

Insert a 3.3 mm thick thickness gauge between cassette tape and bracket. Adjust the position of the cassette-in switch so that the tester is turned to "H" in this position.

5-9-2. Cassette-down Switch Position Adjustment

Tool and equipment:

Tester

Preparation

(1) Remove the cassette-up compartment from the chassis.
(2) Connect the plug of the harness for cassette-up compartment and the terminal on CC-9 board with the jumper leads.

plug of harness (CN1)		terminal on CC-9 board
4pin (5 V)	←→	4pin/CN1
5 or 2pin (GND)	←→	5 or 2pin/CN1

(3) Turn POWER on.

Check procedure:

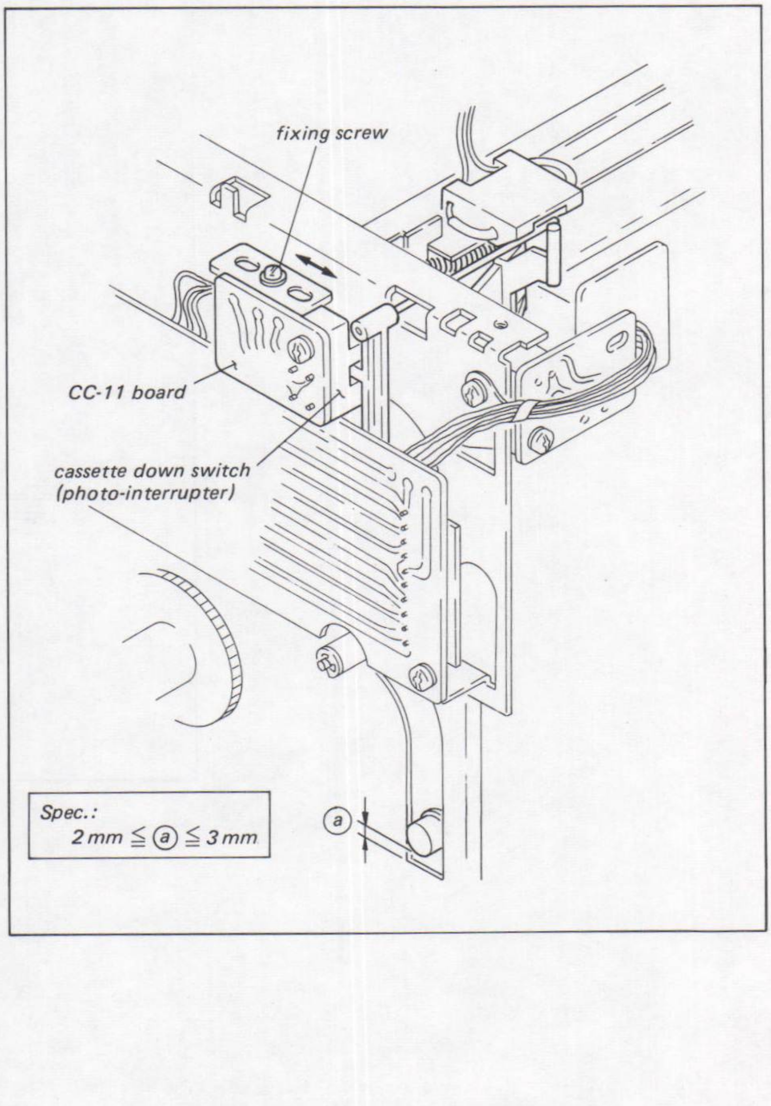
(1) Connect the tester to ⑤ terminal on CC-9 board.
(2) Turn the white colored gear on the right side of the cassette-up compartment in the clockwise direction.
(3) Check that the clearance between the roller and the guide meets the required specification.

Adjustment procedure:

(1) Adjust the position of the cassette-down switch in the arrow direction so that meets the required specification.

Adjusting procedure;

Turn the gear on the right side so that the clearance between the roller and the guide is 2.2 mm clearance. Adjust the position of the cassette-down switch so that the tester is turned to "H" in this position.



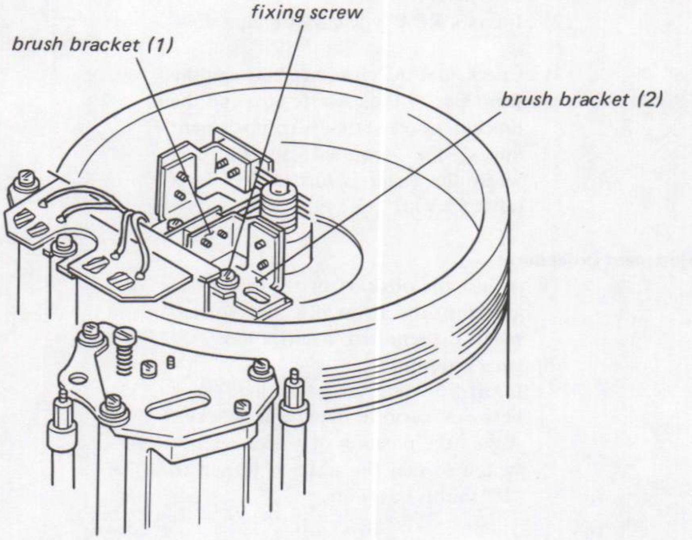
5-10. BRUSH POSITION ADJUSTMENT

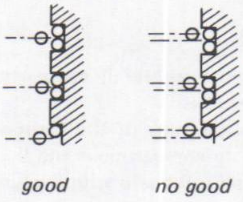
Adjustment procedure:

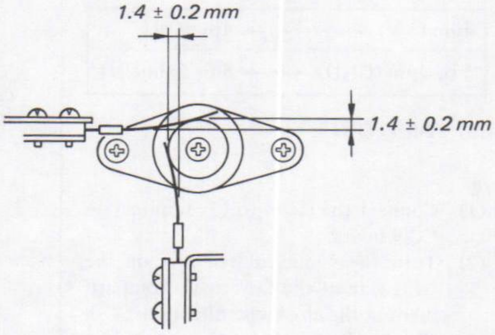
(1) Loosen the fixing screw of the brush bracket (2) and disengage the brush from the slip-ring. And tighten the fixing screw.

(2) Loosen the fixing screw of the brush bracket (1). Adjust the height of the brush bracket (1) to meet the specification.

(3) Loosen the fixing screw of the brush bracket (2) again. Adjust the position of the brush to meet the specification.


fixing screw
brush bracket (1)
brush bracket (2)


good
no good


1.4 ± 0.2 mm
1.4 ± 0.2 mm

5-11. LEAF SPRING POSITION ADJUSTMENT

Check procedure:

(1) Turn on POWER. Put the machine into the EJECT mode after put into the PLAY mode once.

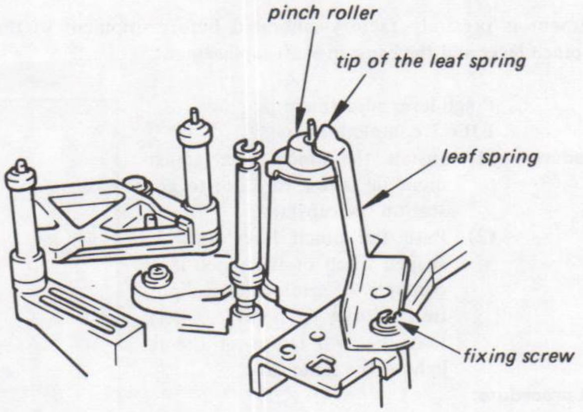
(2) Turn the gear box pulley with finger so that the edge of the T drawer arm is placed into the center of the shaft as shown in figure.

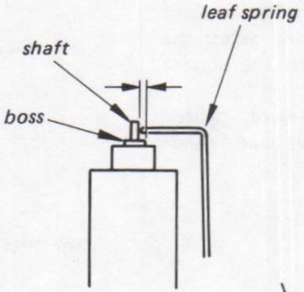
(3) Check that the relationship between leaf spring and pinch roller shaft meets the required specification 1.

(4) Put the machine into the EJECT completion mode. Check that the clearance between leaf spring and pinch roller.

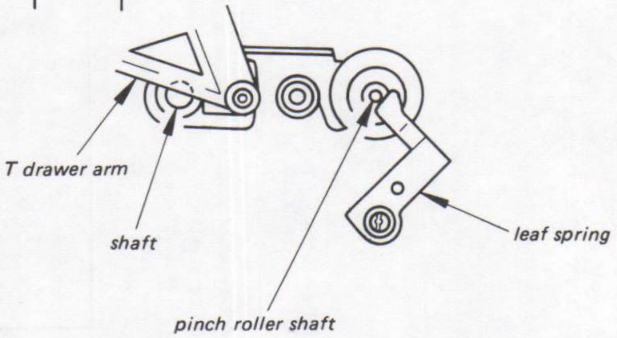
Adjustment procedure:

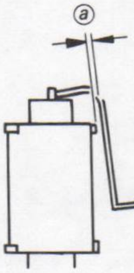
(1) Adjust the position of the leaf spring so that meets the required specifications.


pinch roller
tip of the leaf spring
leaf spring
fixing screw


leaf spring
shaft
boss

Spec. 1:
Tip of the leaf spring is placed between the shaft and the outer surface of the boss.


T drawer arm
shaft
leaf spring
pinch roller shaft



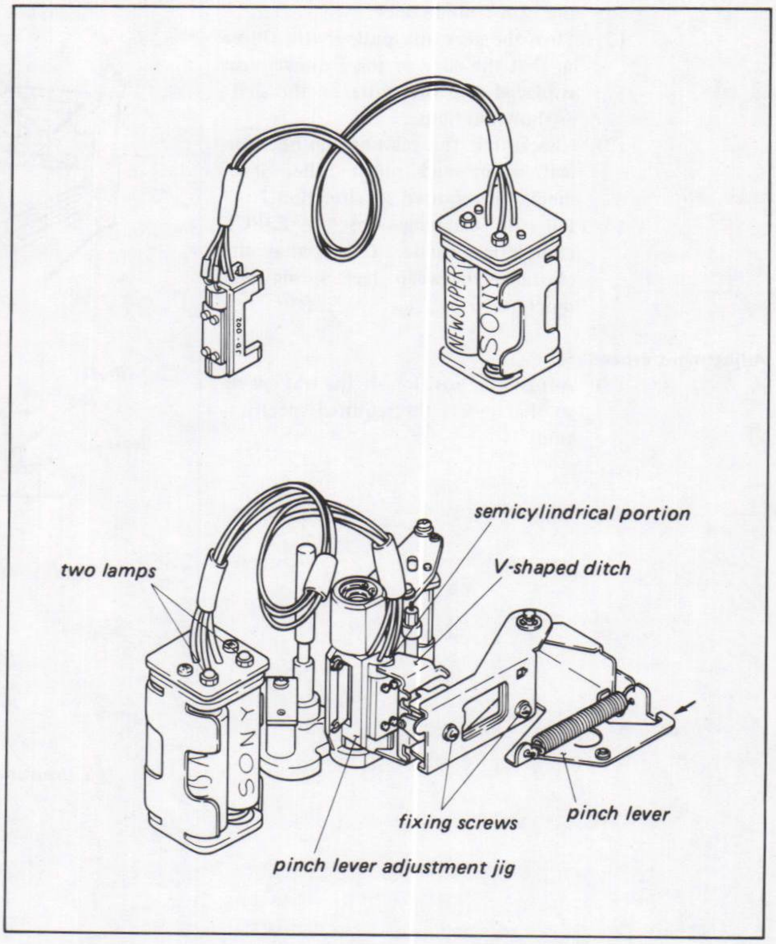
Spec. 2:
Clearance ⓐ should exist.

5-12. PINCH LEVER RIGHT ANGLE ADJUSTMENT

This adjustment is precisely factory-calibrated before shipment so that no adjustment is required except the pinch lever and the capstan shaft replacement.

Tool : Pinch lever adjustment jig
Mode : EJECT completion
Check procedure:
(1) Install the pinch lever adjustment jig taking care not to give scar on the capstan.
(2) Push the pinch lever until V-shaped ditch of the pinch lever contacts the semicylindrical portion of the jig lightly. Check that the two lamps of the jig light at the same time.

Adjustment procedure:
(1) Loosen the two fixing screws of the pinch lever and adjust the V-shaped ditch to the correct position.
(2) After this adjustment, tighten the fixing screws and check again.


JG-002
NEW SUPER
SONY
semicylindrical portion
V-shaped ditch
two lamps
SONY
fixing screws
pinch lever
pinch lever adjustment jig

SECTION 6

BACK TENSION AND TORQUE ALIGNMENT

6-1. BRAKE SYSTEM ADJUSTMENT

6-1-1. S Brake Torque Adjustment

Tool and equipment:

Reel table torque measurement tape (100 mm dia.)

Tension scale (200 g full scale).

Mode: EJECT completion/POWER off.

Check procedure:

(1) Grasp the top of the supply reel table with finger. Check that the clearance between the brake arm and the lining holder meets the required specification (1) as shown in figure as it is turned clockwise direction approx. 30 degrees.

(2) Install the jig tape on the supply reel table and hook a tension scale on an end of the jig tape. Pull out the tape at the constant speed of approx. 9.5 cm/sec. in the arrow direction. Check that the scale reading meets the required specification (2).

Adjustment procedure:

For spec. 1

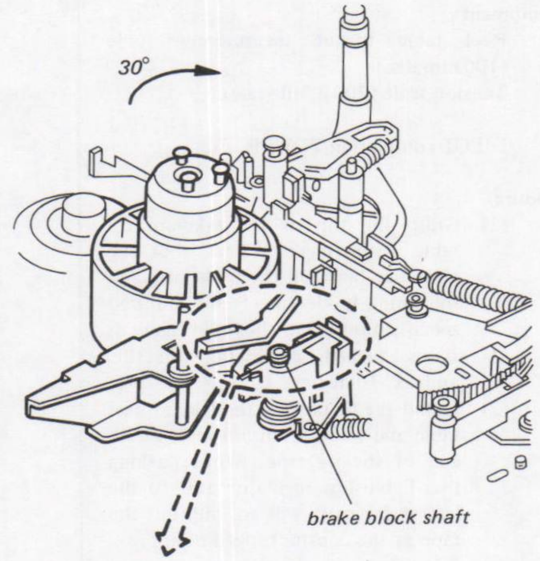
(1) Bend the brake block shaft toward the reel table or the opposite direction with finger.

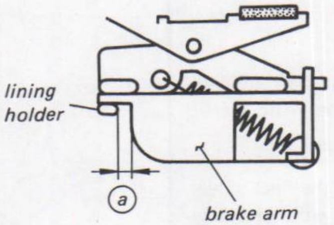
For spec. 2

(2) Clean the surface of the reel table with cloth moistened with cleaning fluid.

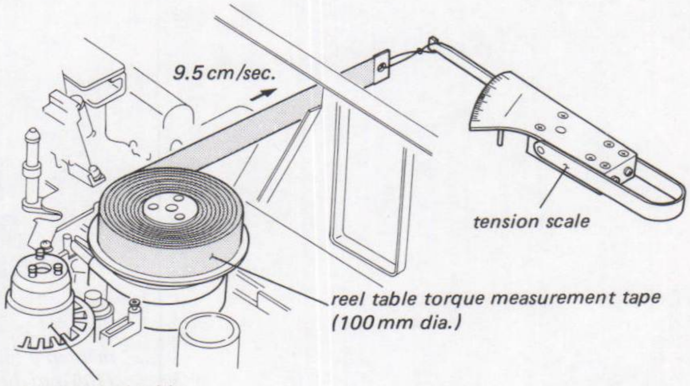
(3) If the scale reading does not meet the specification (2), replace the lining holder and check again.

(4) If not in step (2), replace the reel table and check again.


30°
brake block shaft


lining holder
ⓐ
brake arm

Spec. 1:
0.6 mm ≦ ⓐ ≦ 1.0 mm


9.5 cm/sec.
tension scale
reel table torque measurement tape (100 mm dia.)
take-up reel table

Spec. 2:
100 g ~ 170 g (on scale)
(500 g.cm ~ 850 g.cm)

6-1-2. T Brake Torque Adjustment

Tool and equipment:

Reel table torque measurement tape (100 mm dia.)
Tension scale (200 g full scale).

Mode: EJECT completion/POWER off.

Check procedure:

(1) Grasp the top of the take-up reel table with finger. Check that the clearance between the brake arm and the lining holder meets the required specification (1) as shown in figure as it is turned clockwise direction approx. 30 degrees.

(2) Install the jig tape on the take-up reel table and hook a tension scale on an end of the jig tape. While pushing the T tension regulator arm to the left as far as it will go, pull out the tape at the constant speed of approx. 9.5 cm/sec. in the arrow direction. Check that the scale reading meets the required specification (2).

Adjustment procedure:

For spec. 1

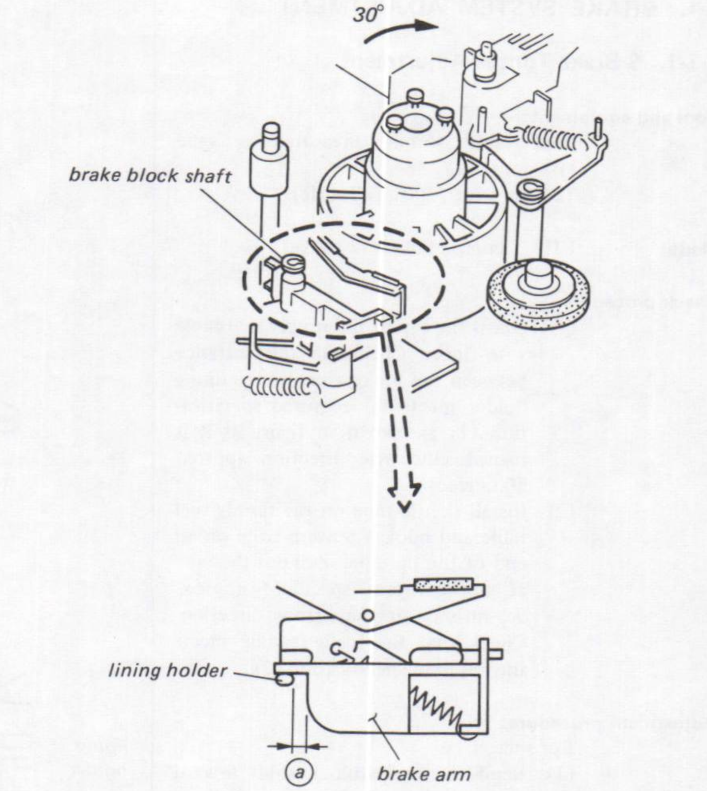
(1) Bend the brake block shaft toward the reel table or the opposite direction with finger.

For spec. 2

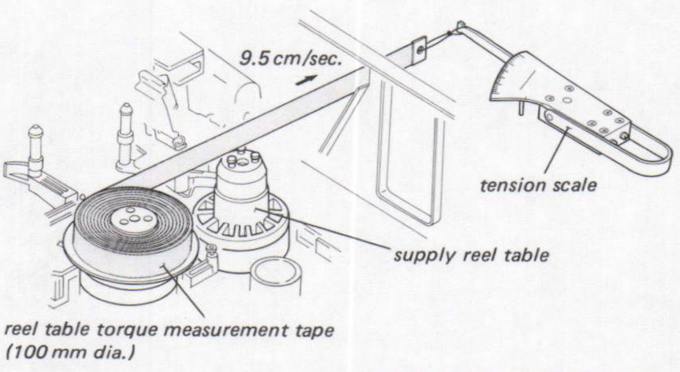
(2) Clean the surface of the reel table with cloth moistened with cleaning fluid.

(3) If the scale reading does not meet the specification (2), replace the lining holder and check again.

(4) If not in step (2), replace the reel table and check again.


30°
brake block shaft
lining holder
ⓐ
brake arm

Spec. 1:
0.6 mm ≦ ⓐ ≦ 1.0 mm


9.5 cm/sec.
tension scale
supply reel table
reel table torque measurement tape (100 mm dia.)

Spec. 2:
100 g ~ 170 g (on scale)
(500 g.cm ~ 850 g.cm)

6-1-3. REW Brake Torque Adjustment

Tool and equipment:

Reel table torque measurement tape (100 mm dia.)
Tension scale (50 g full scale)

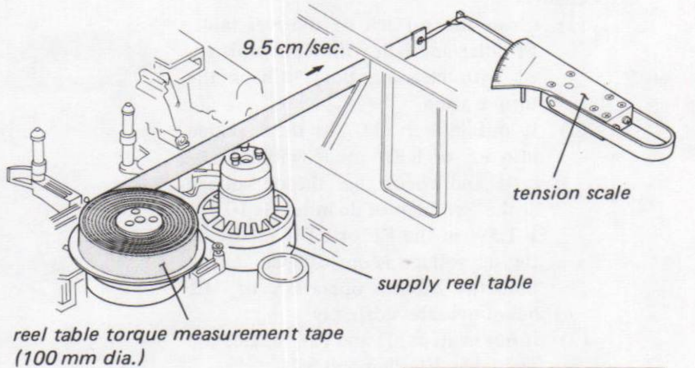
Mode: REW

Check procedure:

(1) Install the jig tape on the take-up reel table and hook a tension scale on an end of the jig tape.
(2) Put the machine into the REW mode. Pull out the tape at the constant speed of approx. 9.5 cm/sec. in the arrow direction. Check that the scale reading meets the required specification.

Adjustment procedure:

(1) If the scale reading does not meet the specification, replace the R brake ass'y and check again.
(2) If not in step (1), replace the reel table and check again.


9.5 cm/sec.
tension scale
supply reel table
reel table torque measurement tape
(100 mm dia.)

Spec.:
18 g ~ 36 g (on scale)
(90 g.cm ~ 180 g.cm)

6-2. FF/REW TORQUE ADJUSTMENT

- It is required that the sec. 5-8-3 T idler solenoid position adj. and sec. 5-8-4 S idler solenoid position adj. are checked to be correct or properly adjusted before initiating this adjustment.

Tool and equipment:

Reel table torque measurement tape (100 mm dia.)
Tension scale (500 g full scale).

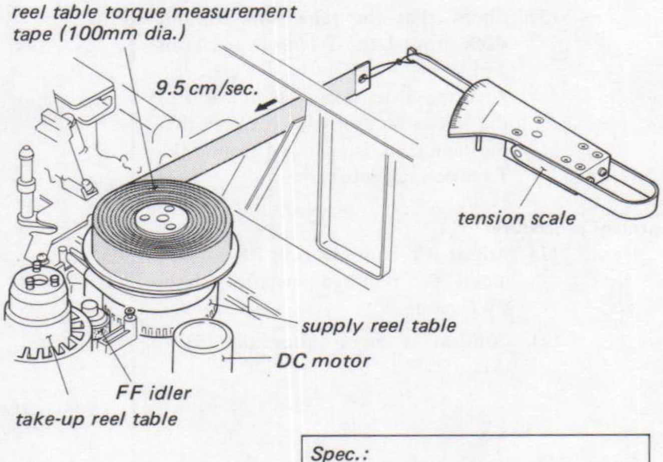
Mode: FF and REW

Check procedure:

FF torque
(1) Install the jig tape on the take-up reel table and hook a tension scale on an end of the tape. Pull out the tape.
(2) Put the machine into FF mode. Let the tape pulled at the constant speed of approx. 9.5 cm/sec. check that the scale reading meets the required specification.

REW torque
(3) Install the jig tape on the supply reel table and hook a tension scale on an end of the tape. Pull out the tape.
(4) Put the machine into the REW mode. Let the tape pulled at the constant speed of approx. 9.5 cm/sec. Check that the scale reading meets the required specification.

< REW torque measurement method >


reel table torque measurement
tape (100mm dia.)
9.5 cm/sec.
tension scale
supply reel table
DC motor
FF idler
take-up reel table

Spec.:
higher than 300 g (on scale)
(higher than 1500 g.cm)

Adjustment procedure:

Both FF torque and REW torque are adjusted by the following adjustment procedures.

(1) Clean the surface of the reel table, FF idler and belt with cloth moistened with cleaning fluid. Check the torque again.

(2) If not in step (1), put the machine into FF or REW mode without cassette and check that the dc voltage at the terminals of dc motor is 10.5 V ± 1.5 V in the FF or REW mode. If the dc voltage is out of spec., check that the circuit operation of MR board operates correctly.

(3) If not in steps (1) and (2), replace the reel table, FF idler and belt.

6-3. FWD TORQUE ADJUSTMENT

Mode: FWD/FWD search

Check procedure:

(1) Install the KCS-20 cassette tape at the tape end portion.

(2) Put the machine into the FWD mode. Check that the relationship between the T tension regulator arm and cassette tape meets the required specification.

(3) Install the KCA-60 cassette tape at the tape end portion.

(4) Put the machine into x5 FWD search mode.

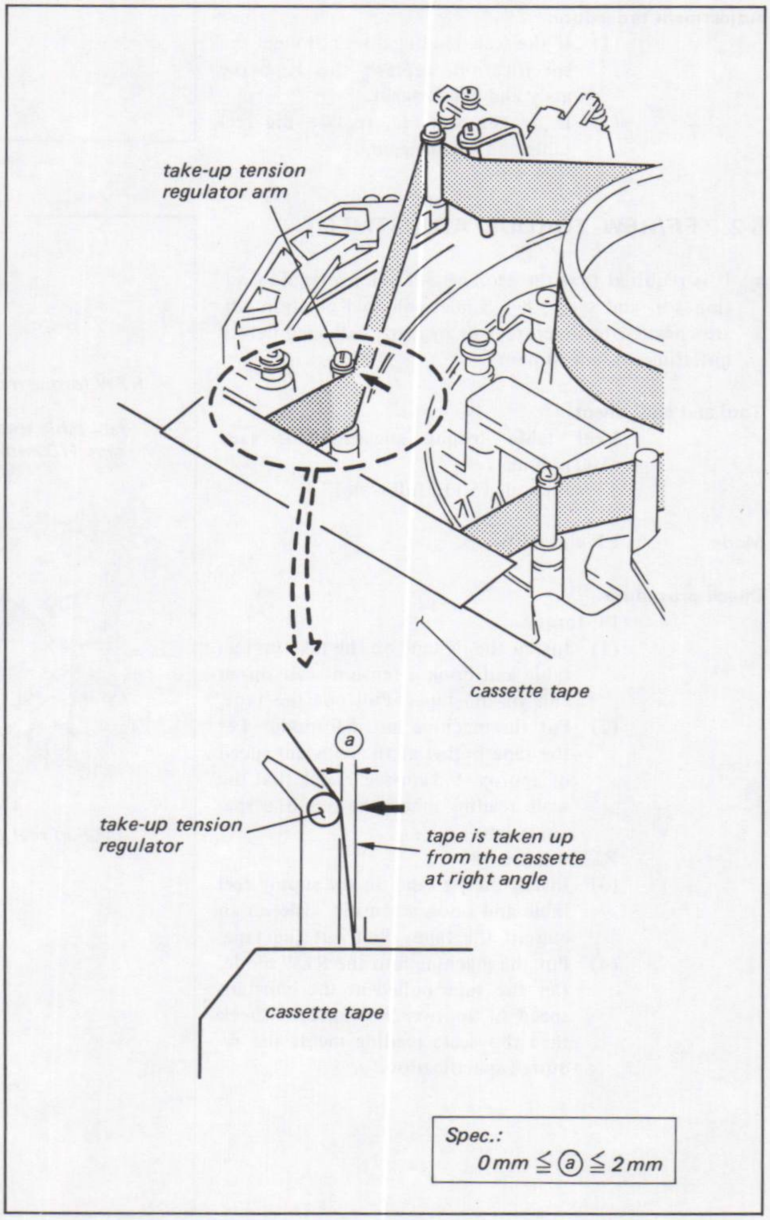
(5) Check that the tape runs without slack around the T tension regulator arm.

(6) Push the T tension regulator arm to the left as far as it will go, check that the tape slack is occurred around the T tension regulator arm.

Adjustment procedure:

(1) Adjust RV-1 on MR-6 or RS-6 board meets the required specification in FWD mode.

(2) Confirm as check procedures (3) ~ (6).


take-up tension regulator arm
cassette tape
ⓐ
take-up tension regulator
tape is taken up from the cassette at right angle
cassette tape
Spec.:
0 mm ≦ ⓐ ≦ 2 mm

6-4. REV TORQUE ADJUSTMENT

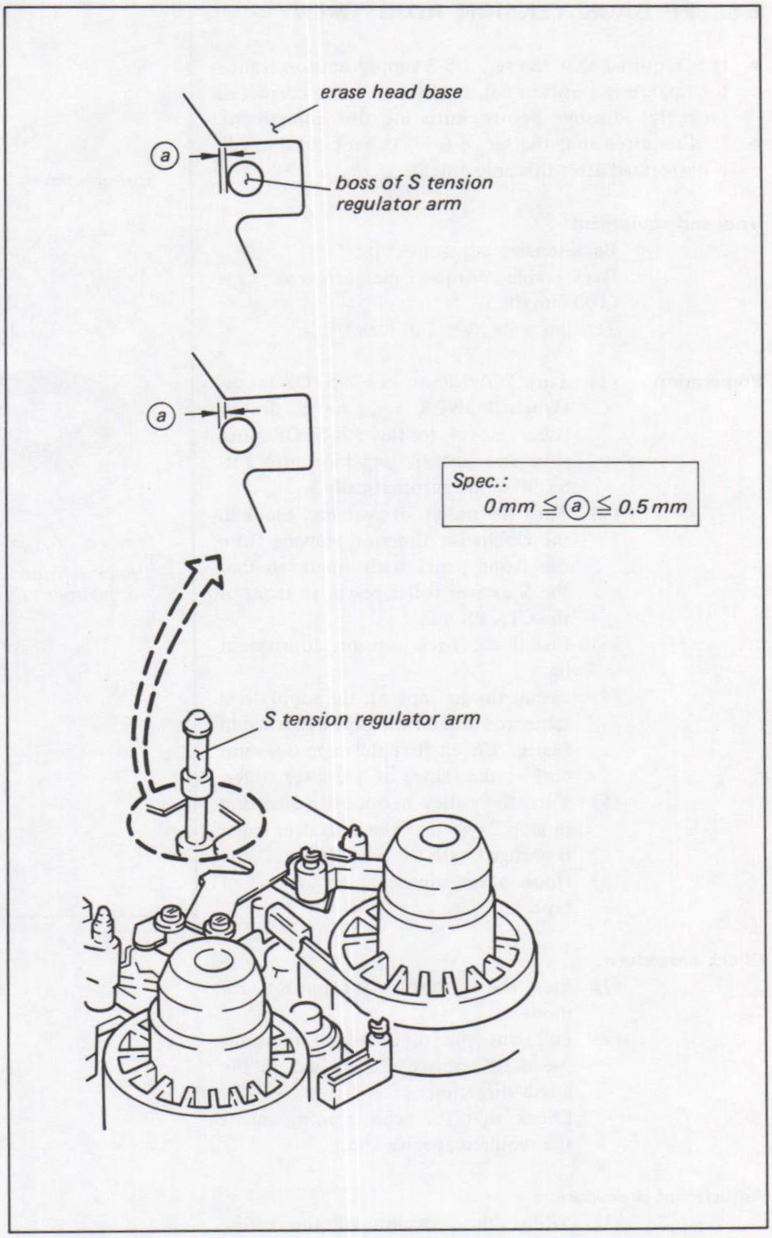
Mode: REV (about ×1) mode

Check procedure:

(1) Install the KCS-20 cassette tape at the tape top portion.
(2) Put the machine into REV mode.
(3) Check that the relationship between the boss of S tension regulator and the bracket of erase head base meets the required specification.

Adjustment procedure:

(1) Adjust RV-2 on MR-6 or RS-6 board meets the required specification.


erase head base
ⓐ
boss of S tension regulator arm
ⓐ
Spec.:
0 mm ≦ ⓐ ≦ 0.5 mm
S tension regulator arm

6-5. FF BACK TENSION ADJUSTMENT

- It is required that the sec. 5-6-3 supply tension regulator operating position adj. is checked to be correct or properly adjusted before initiating this adjustment.
- It is required that the sec. 6-6 FWD back tension adj. is performed after this adjustment.

Tool and equipment:

Back tension adjustment jig.
Reel table torque measurement tape (100 mm dia.)
Tension scale (50 g full scale)

Preparation:

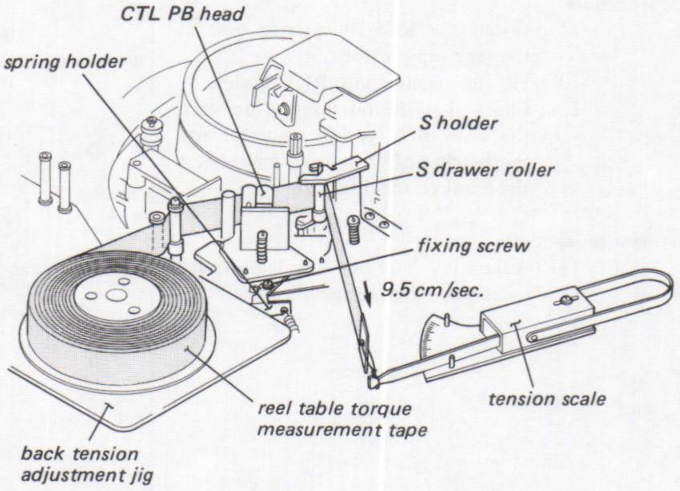
(1) Turn POWER on in FR-STOP mode. (When POWER on, the S drawer roller moves to the FR-STOP position and put the machine into FR-STOP mode automatically.)
(2) Turn the pulley of gear box block in the clockwise direction viewing from the front panel with finger so that the S drawer roller places in front of the CTL PB head.
(3) Install the back tension adjustment jig.
(4) Install the jig tape on the supply reel table and thread the tape as shown in figure. Check that the tape does not curl at the flange of S drawer roller.
(5) Turn the pulley in opposite direction in step 2) so that the S drawer roller is engaged with the S holder.
(6) Hook a tension scale on an end of tape.

Check procedure:

(1) Press the FF button and put into FF mode.
(2) Pull out the tape at the constant speed of approx. 9.5 cm/sec. in the arrow direction.
Check that the scale reading meets the required specification.

Adjustment procedure:

(1) Adjust the position of the spring holder meets the required specification with flat blade screwdriver, 3 mm dia.
(2) Check that the scale reading meets the required specification once refer to the check procedure.
(3) Perform sec. 6-6 FWD back tension adjustment.



Spec.:
40g ~ 50g (on scale)

6-6. FWD BACK TENSION ADJUSTMENT

- It is required that the sec. 5-6-3 supply tension regulator operating position adj. and sec. 6-5 FF back tension adj. are checked to be correct or properly adjusted before initiating this adjustment.

Tool and equipment:

Back tension adjustment jig.
Reel table torque measurement tape (100 mm dia.)
Tension scale (100 g full scale)

Preparation:

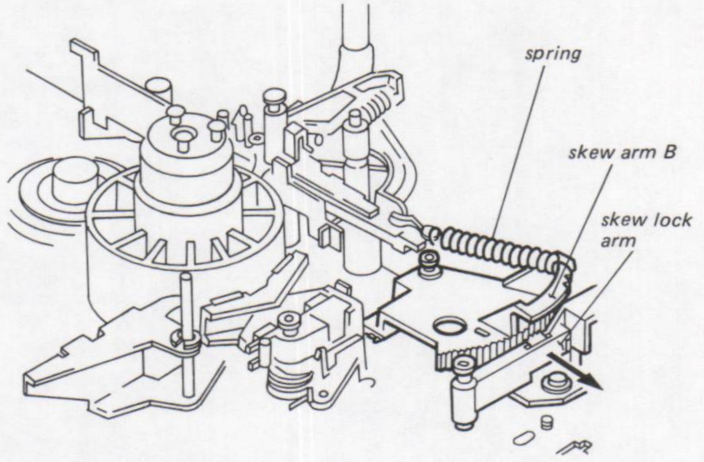
(1) Push the skew arm in the arrow direction.
(2) Turn on the POWER and put the machine into the FR-STOP mode. (When turn on the POWER, the S drawer roller moves to the FR-STOP position and put the machine into the FR-STOP mode automatically.)
(3) Turn the pulley of gear box block in the clockwise direction viewing from the front panel with finger so that the S drawer roller places in front of the CTL PB head.
(4) Install the back tension adjustment jig.
(5) Install the jig tape on the supply reel table and thread the tape as shown in figure.
Check that the tape does not curl at the flange on S drawer roller.
(6) Turn the pulley in opposite direction in step (3) so that the S drawer roller is engaged with the S holder.
(7) Hook a tension scale on an end of tape.

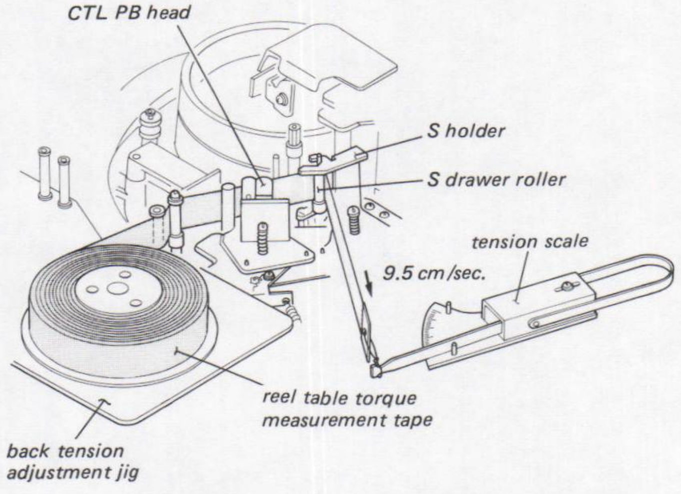
Check procedure:

(1) Press the PLAY button and put into PLAY mode.
(2) Pull out the tape at the constant speed of approx. 9.5 cm/sec. in the arrow direction.
Check that the scale reading meets the required specification.

Adjustment procedure:

(1) Select the proper spring hook of the skew arm B so that the scale reading meets the required specification.
(2) After this adjustment, check again refer to check procedure.




CTL PB head
S holder
S drawer roller
tension scale
9.5 cm/sec.
reel table torque measurement tape
back tension adjustment jig

Spec.:
70 g ~ 75 g (on scale)

SECTION 7
TAPE RUN ALIGNMENT

7-1. FF/REW MODES TAPE PATH ADJUSTMENT

Mode: FF and REW

Check procedure:

(1) Install KCA-60 cassette tape (after the KCA-60 tape has run after 30 minutes). Put the machine into REW mode.

(2) Observe the surface of the running tape very carefully around T drawer arm. Check that the tape tension is exactly equal at the tape top and tape bottom. (Spec. 1)

(3) Check that the tape runs without curl at the upper or lower flange of S drawer roller in the REW mode. (Spec. 2)

(4) Put the machine once into the STOP mode, and put into the REW mode. Check that the tape runs without curl at the S drawer roller in the moment of just after the REW mode. (Spec. 3)

(5) Put the machine into FF mode. Check that the tape runs without curl at the S drawer roller and T drawer arm in the moment of just after the FF mode. (Spec. 4)

(6) Put the machine into FWD mode. Check that the top of the correct guide pin does not contact with the tape and drum. (Spec. 5)

Adjustment procedure:

Spec. 1

(1) Adjust the slantness of T drawer arm by turning the T drawer arm adjusting screw.

Spec. 2

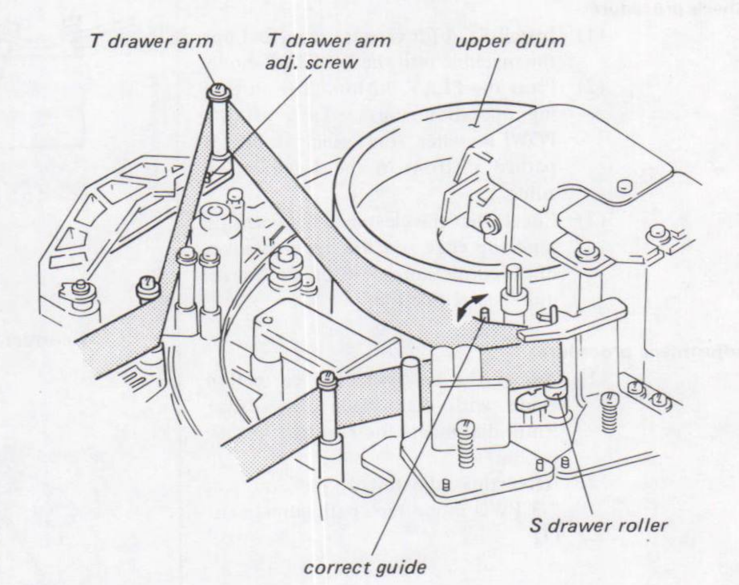
(2) Bend the bottom of the correct guide with pliers in the arrow direction.

Spec. 3

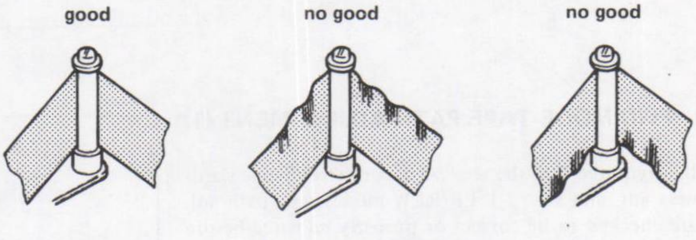
(3) Fine bend the bottom of the correct guide with pliers to satisfies the spec. 2) and 3).

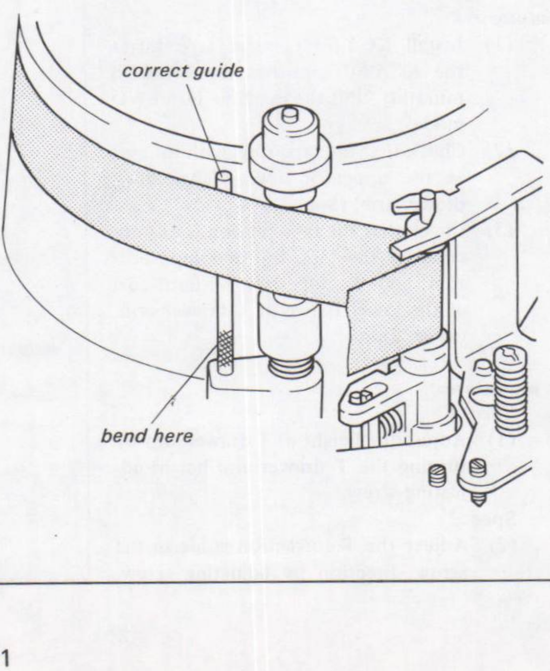
Spec. 4

(4) Fine adjust the slantness of the T drawer arm by turning the T drawer arm adjusting screw to satisfies the spec. 1) and 4).



Spec. 1.





7-2. T CORRECTION GUIDE SLANTNESS ADJUSTMENT

Check procedure:

(1) Install KCA-60 cassette tape, and put the machine into the FR-STOP mode.

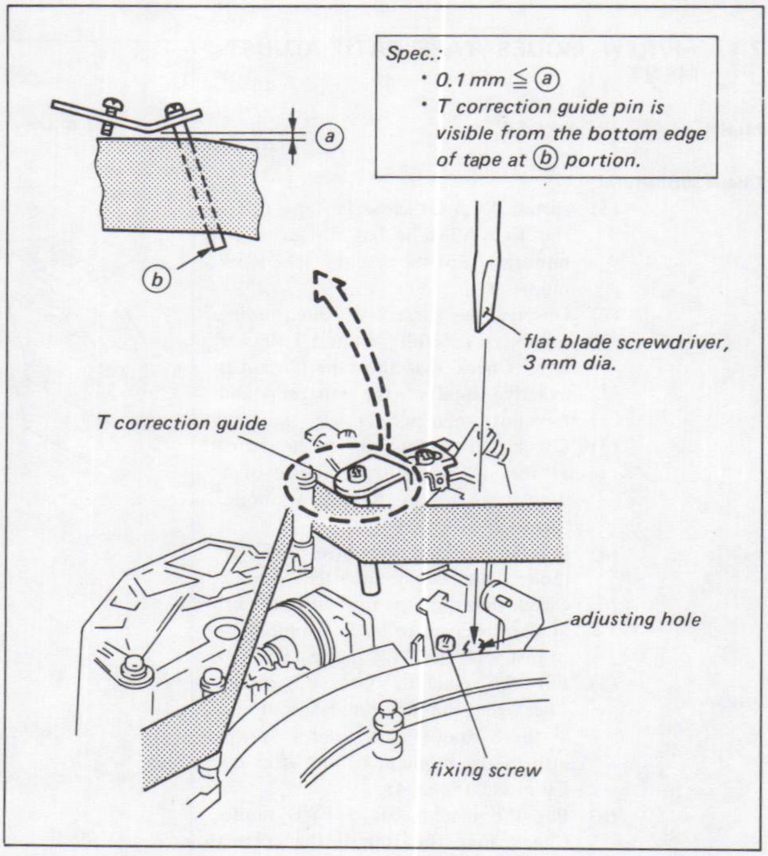
(2) Press the PLAY button. The threading operation starts. Turn off the POWER when the pinch roller is pathed in front of the T correction guide.

(3) Check that the clearance between the tape top edge and the upper bracket of T correction guide meets the required specification.

Adjustment procedure:

(1) Adjust the position of T correction guide with flat blade screwdriver 3 mm dia. meets the required specification.

(2) After this adjustment, perform sec. 7-3 FWD mode tape path adjustment (1).


Spec.:
· 0.1 mm ≦ ⓐ
· T correction guide pin is visible from the bottom edge of tape at ⓑ portion.
ⓐ
ⓑ
flat blade screwdriver, 3 mm dia.
T correction guide
adjusting hole
fixing screw

7-3. FWD MODE TAPE PATH ADJUSTMENT (1)

- It is required that the sec. 7-2 T correction guide slantness adj. and sec. 7-1 FF/REW modes tape path adj. are checked to be correct or properly adjusted before initiating this adjustment.

Mode: FWD

Check procedure:

(1) Install KCA-60 cassette tape (after the KCA-60 tape has run after 30 minutes). Put the machine into FWD mode.

(2) Check that the tape runs without curl at the upper or lower flange of T drawer arm. (Spec. 1)

(3) Check that the tape tension is exactly equal at the tape top and tape bottom, and the tape runs without curl at the lower flange of T drawer arm. (Spec. 2)

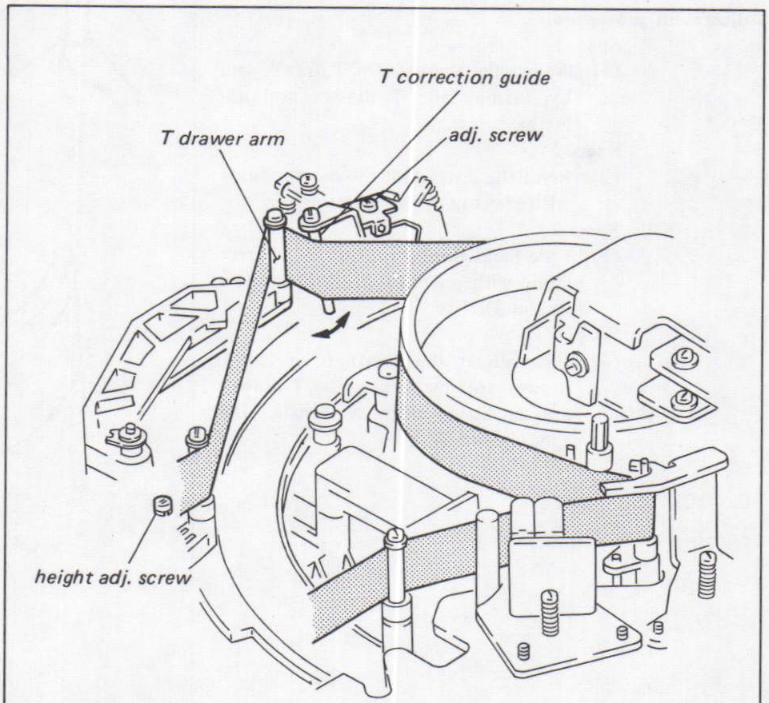
Adjustment procedure:

Spec. 1

(1) Adjust the height of T drawer arm by turning the T drawer arm height adjusting screw.

Spec. 2

(2) Adjust the T correction guide in the arrow direction by adjusting screw.


T correction guide
T drawer arm
adj. screw
height adj. screw

7-4. FWD MODE TAPE PATH ADJUSTMENT (2)

Mode: FWD

Check procedure:

(1) Install KCA-60 cassette tape (after the KCA-60 tape has run after 30 minutes). Put the machine into FWD mode.

(2) Check to see carefully two positions indicated by the ※ mark in figure, check that the tape tension is exactly equal at the tape top and tape bottom. (Spec. 1)

(3) Check that the clearance between the lower flange of threading roller and the tape bottom edge meets the required specification (2).

Adjustment procedure:

(1) Loosen the fixing screw in the bottom of the threading roller as shown in figure.

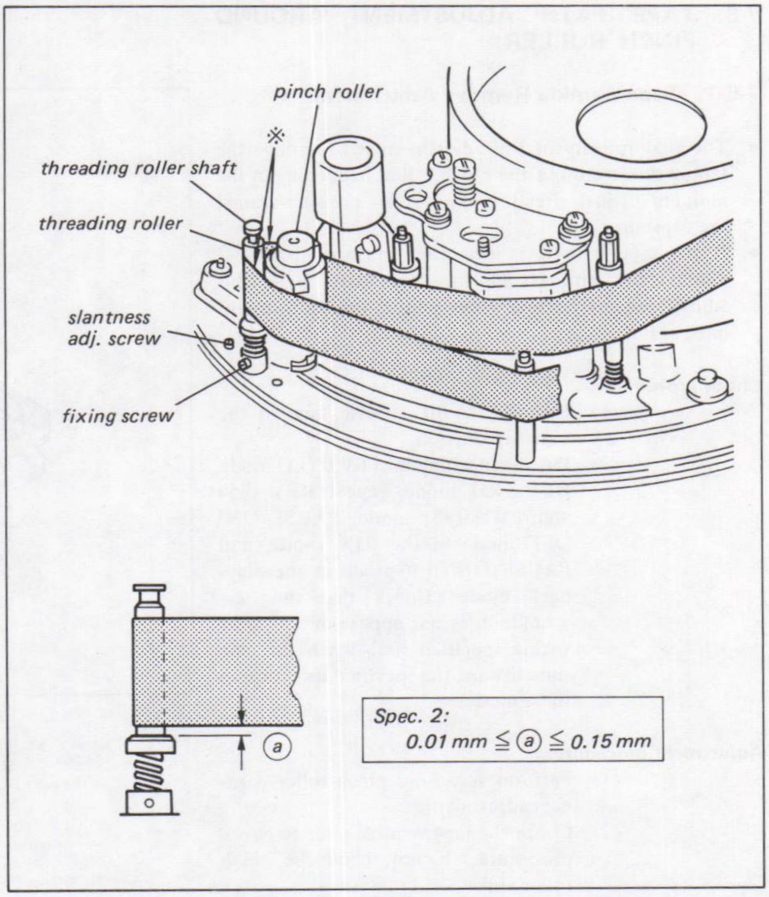
Spec. 1

(2) Adjust the slantness of the threading roller by turning the slantness adjusting screw.

Spec. 2

(3) Adjust the height of the threading roller by turning the threading roller shaft.

(4) Check again that the slantness and height meets the required specification 1) and 2).



Spec. 2:
0.01 mm ≦ ⓐ ≦ 0.15 mm

7-5. REV MODE TAPE PATH ADJUSTMENT

Check procedure:

(1) Install KCA-60 cassette tape (after the KCA-60 tape has run after 30 minutes).

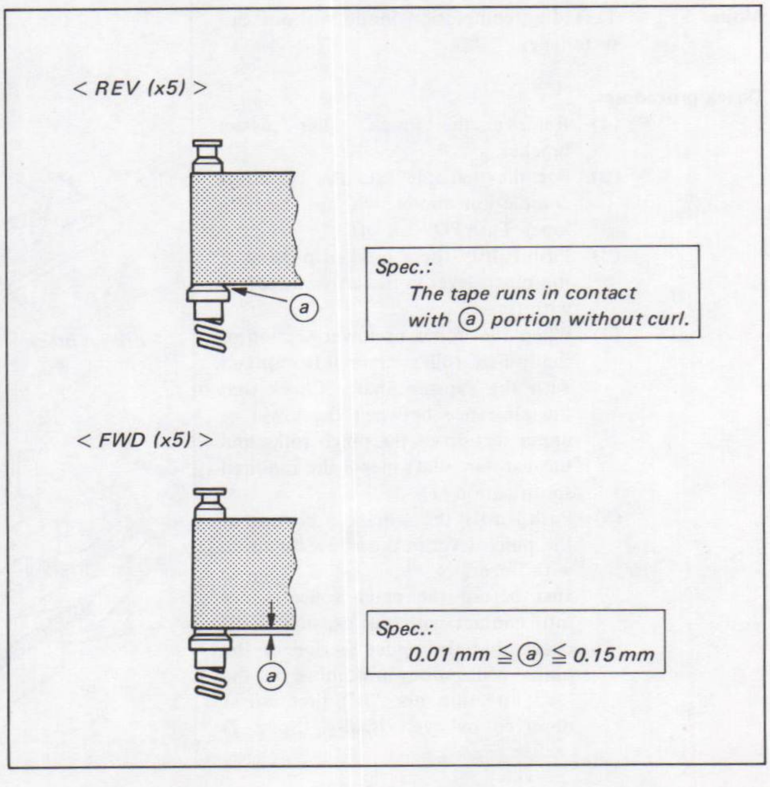
(2) Put the machine into REV (x5) mode. Check that the tape runs in contact with the lower flange of the threading roller without curl.

(3) Put the machine into FWD (x5) mode. Check that the clearance between the lower flange of the threading roller and the tape bottom edge meets the required specification and the tape does not curl at the lower or upper flange of TG-IV.

Adjustment procedure:

(1) Fine adjust the height of the threading roller by turning the threading roller shaft.

(2) After this adjustment, perform sec. 7-4 FWD mode tape path adjustment (2).



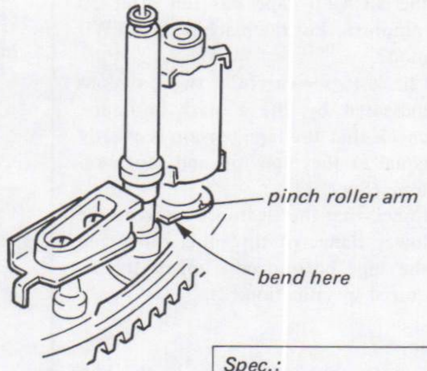
Spec.:
The tape runs in contact with ⓐ portion without curl.

Spec.:
0.01 mm ≦ ⓐ ≦ 0.15 mm

7-6. TAPE PATH ADJUSTMENT AROUND PINCH ROLLER

7-6-1. Tape Wrinkle Remove Adjustment

- The first priority of this adjustment is to remove the tape wrinkle around the pinch roller, happening in the moment of just after the pinch roller pressing against the capstan.
- If the tape wrinkle is generated, perform sec. 7-6-2 pinch roller slantness adjustment at first. After this adjustment performed, fine adjust this adjustment once again.



Spec.:
Tape wrinkle disappears within 2 seconds.

Check procedure:

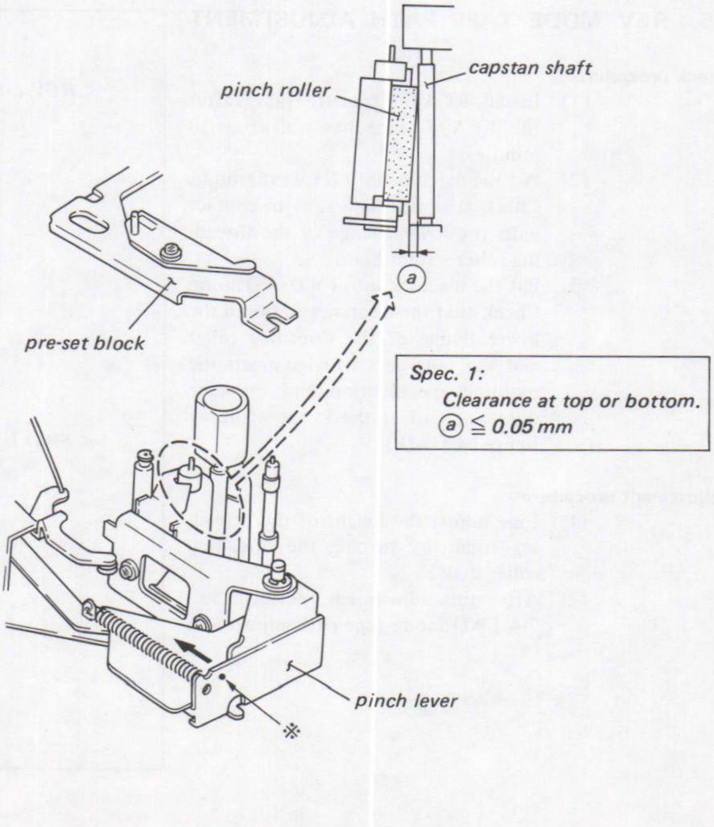
(1) Install KCA-60 cassette tape at the tape top portion.
(2) Put the machine into FWD (x1) mode, REV (x5) mode, repeat REV (x5) and FWD (x5) mode, PAUSE ON/OFF mode in the REC mode, and PAUSE ON/OFF mode in the playback mode. Check that the tape wrinkle does not appear or disappear within specified time when the tape runs toward the specified direction in these modes.

Adjustment procedure:

(1) Perform sec. 7-6-2 pinch roller slantness adjustment.
(2) Check the tape wrinkle refer to check procedure. If not, bend the pinch roller arm.

7-6-2. Pinch Roller Slantness Adjustment

Mode: Threading completion mode without cassette tape.



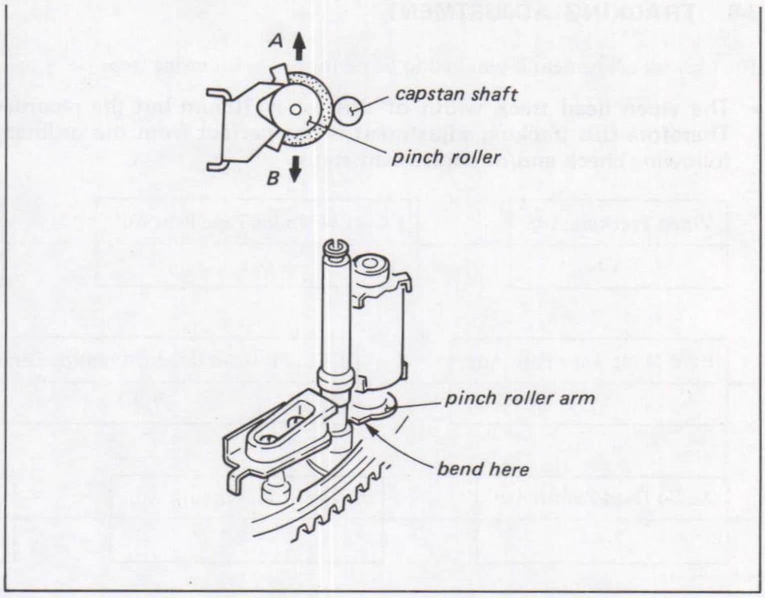
Spec. 1:
Clearance at top or bottom.
ⓐ ≦ 0.05 mm

Check procedure:

(1) Remove the pinch roller pre-set bracket.
(2) Put the machine into the threading completion mode without cassette tape. Turn POWER off.
(3) Push lightly the ※ marked portion of the pinch lever in the arrow direction with finger.
(4) When the upper or lower section of the pinch roller came into contact with the capstan shaft. Check that the clearance between the lower or upper section of the pinch roller and the capstan shaft meets the required specification (1).
(5) Push lightly the ※ marked portion of the pinch lever in the arrow direction with finger.
Just before the pinch roller comes into contact with the capstan shaft, check that the upper section of the pinch roller does not move in the "A" direction nor "B" direction as observed by eye, visually. (Spec. 2)

Adjustment procedure:

(1) Turn POWER on. The threading ring put into the unthreading operation. Turn POWER off in the moment when the pinch roller comes in front of the audio/CTL head.
(2) Bend the pinch roller arm.
(3) Check that the pinch roller slantness meets the required specification referring to check procedure. If not, repeat the foregoing step 2) until the specification 1) and 2) are met.
(4) Install the pinch roller pre-set bracket, and perform sec. 5-4-2 pinch roller pre-set adj.


A
capstan shaft
pinch roller
B
pinch roller arm
bend here

7-7. 10 TIMES PICTURE SEARCH · TAPE PATH ADJUSTMENT

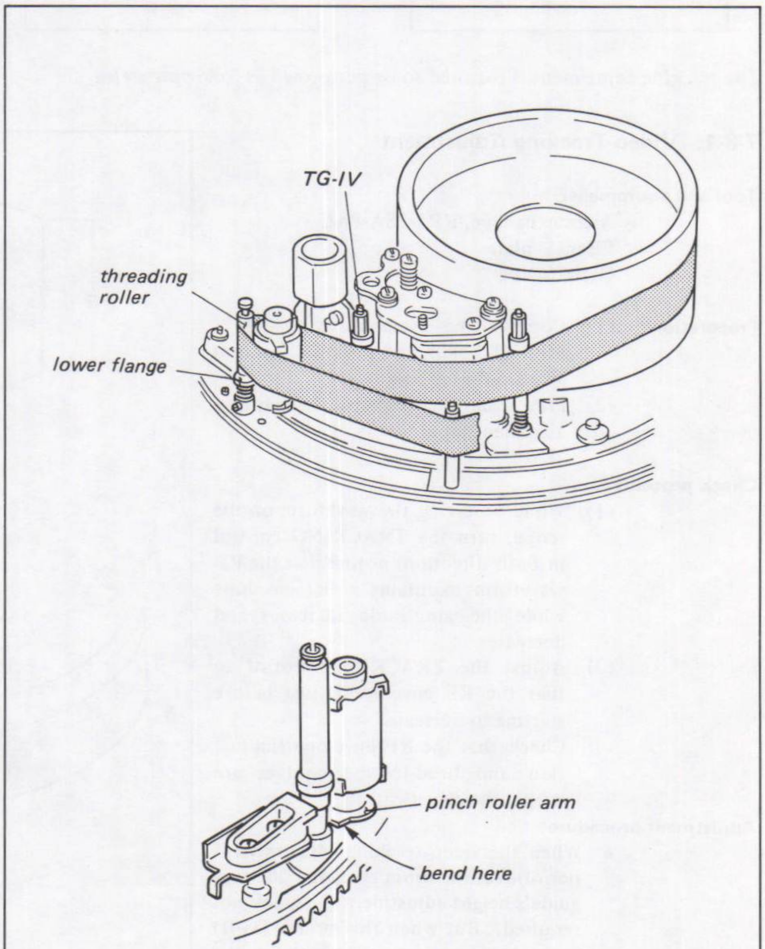
Mode: −10 times picture search
(This mode is set up by using RM-440CE. If RM-440CE is not available, refer to sec. 2-8.)

Check procedure:

(1) Install KCS-20 cassette tape (after the KCS-20 tape has run after 10 minutes).
(2) Put the machine into −10 times picture search mode.
(3) Check that the tape runs in contact with the lower flange of the threading roller without curl and the tape does not curl at the lower and upper flanges of TG-IV.

Adjustment procedure:

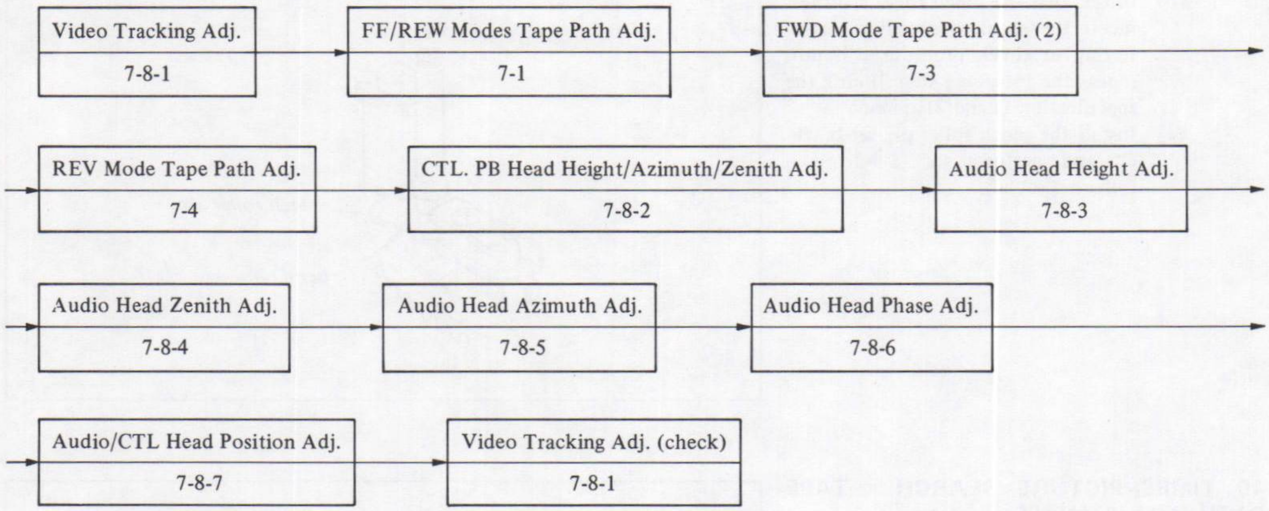
(1) Bend the pinch roller arm.


TG-IV
threading roller
lower flange
pinch roller arm
bend here

7-8. TRACKING ADJUSTMENT

The tracking adjustment is required to be performed as following steps.

- **The video head track width of this set is 105μm but the recorded video track width on the alignment tape is 85μm. Therefore this tracking adjustment is not perfect from the ordinary U-matic VTR's adjustment. Be sure to perform the following check and/or adjustment steps.**


Video Tracking Adj.
7-8-1
FF/REW Modes Tape Path Adj.
7-1
FWD Mode Tape Path Adj. (2)
7-3
REV Mode Tape Path Adj.
7-4
CTL. PB Head Height/Azimuth/Zenith Adj.
7-8-2
Audio Head Height Adj.
7-8-3
Audio Head Zenith Adj.
7-8-4
Audio Head Azimuth Adj.
7-8-5
Audio Head Phase Adj.
7-8-6
Audio/CTL Head Position Adj.
7-8-7
Video Tracking Adj. (check)
7-8-1

The tracking adjustment is required to be performed as following steps.

7-8-1. Video Tracking Adjustment

Tool and equipment:

Alignment tape, RR5-2SA-PAL
Flatness plate
Oscilloscope

Preparation:

(1) Connect the oscilloscope to TP17/MP-12A board, and EXT.TRIG. from TP11/SV-31A board.

(2) Play back the color-bar segment of alignment tape.

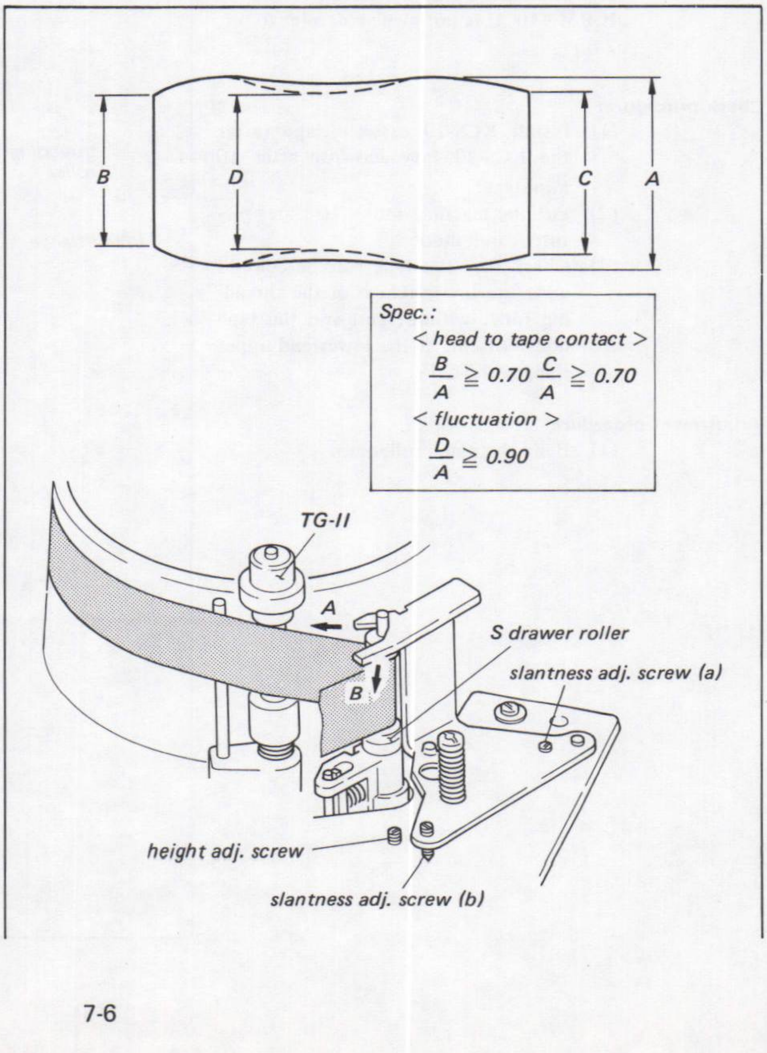
Check procedure:

(1) While observing the waveform on the scope, turn the TRACKING control in both directions noting that the RF waveform maintains a flat envelope while the amplitude increases and decreases.

(2) Adjust the TRACKING control so that the RF envelope is just before starting to decrease.
Check that the RF envelope fluctuation and head-to-tape contact are within the specification.

Adjustment procedure:

- When the video tracking adjustment is performed, the drum entrance side tape guide's height adjustment is usually not required. But when this guide (TG-II) is replaced or removed, adjust the height of this guide so that the tape runs at the center of this guide without tape runs in contact with upper or lower flange.



Spec.:

< head to tape contact >

$\frac{B}{A} \geqq 0.70 \quad \frac{C}{A} \geqq 0.70$

< fluctuation >

$\frac{D}{A} \geqq 0.90$

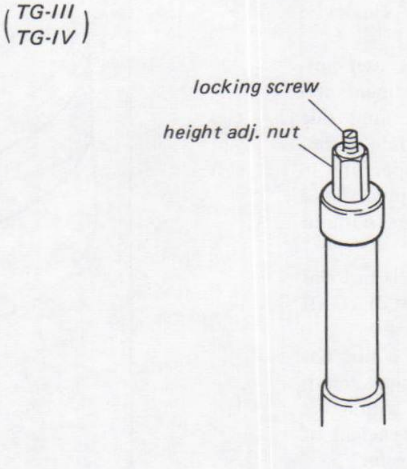
B
D
C
A
TG-II
A
B
S drawer roller
slantness adj. screw (a)
height adj. screw
slantness adj. screw (b)

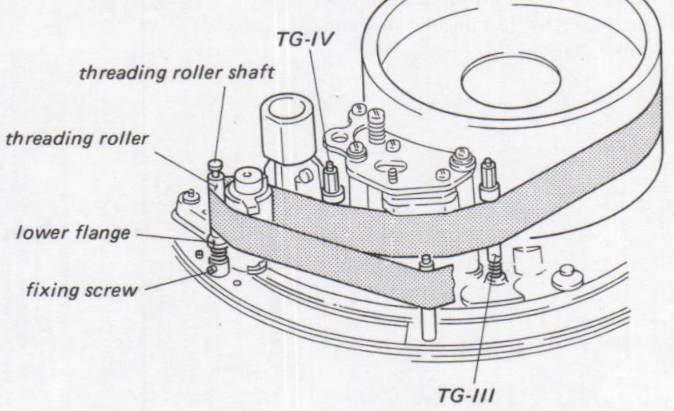
- S drawer roller unit has three adjusting screws. These three adjusting screws functions as follows.
  - (i) Slantness adjusting screw (a)
    Turning this screw in the clockwise direction, the upper section of S drawer roller slants in the arrow "A" direction.
  - (ii) Slantness adjusting screw (b)
    Turning this screw in the counter clockwise direction, the upper section of S drawer roller slants in the arrow "B" direction.
    The RF envelope meets the required specification but tape runs curl at upper flange of S drawer roller, this screw is only used in this manner to remove tape curl.
  - (iii) Height adjusting screw
    Turning this screw in the clockwise direction, makes the height of S drawer roller lower.
- When the drum exit side tape guides (TG-III, TG-IV) adjustment are performed, loosen the locking screw 1 ~ 2 turns and adjust the height by turning the height adjusting nut.
- When the tracking at the drum's input side is no good.
  - (1) Set the TRACKING control so that the RF envelope amplitude is made to 70 ~ 80% of the maximum amplitude.
  - (2) Adjust height and slantness of S drawer roller by turning the height adjusting screw and slantness adjusting screw (a) so that the RF envelope is flat.

(CAUTION)

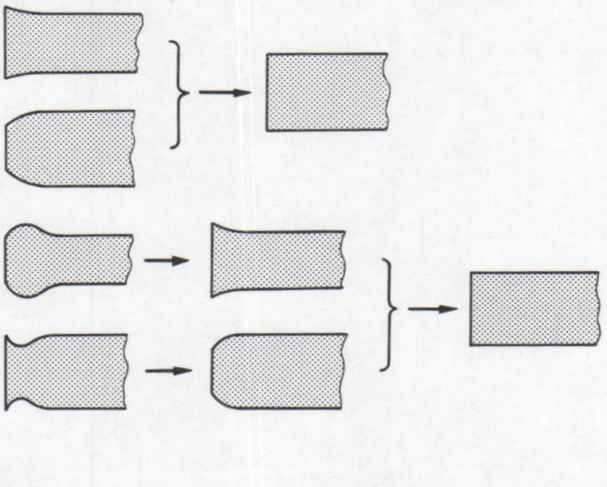
- (i) Observe the surface of the running tape very carefully around S drawer roller. Check that the tape tension is exactly equal at the tape top and tape bottom.
- (ii) Check that the tape runs in contact with the upper flange of S drawer roller without tape curl.

- When the tracking at the drum's center portion is no good. It is required that the drum's input side tracking adjustment to be correctly adjusted before initiating this adjustment.
  - (3) Set the TRACKING control so that the RF envelope amplitude is made to 70 ~ 80% of the maximum amplitude.
  - (4) Adjust height and slantness of S drawer roller by turning the height adjusting screw and slantness adjusting screw (a) so that the RF envelope is flat.





< drum entrance side >



(CAUTION)

(i) Adjust the slantness adjusting screw (a) in the clockwise within 10 degrees.

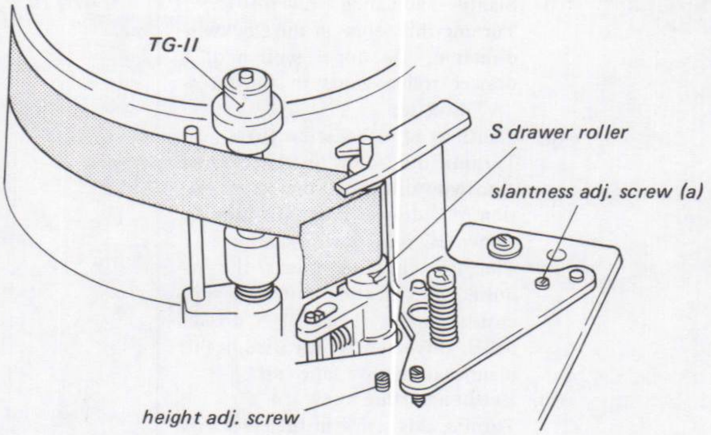
(ii) When the drum's center portion tracking adjustment performs, the drum's input side tracking must maintain to flat.

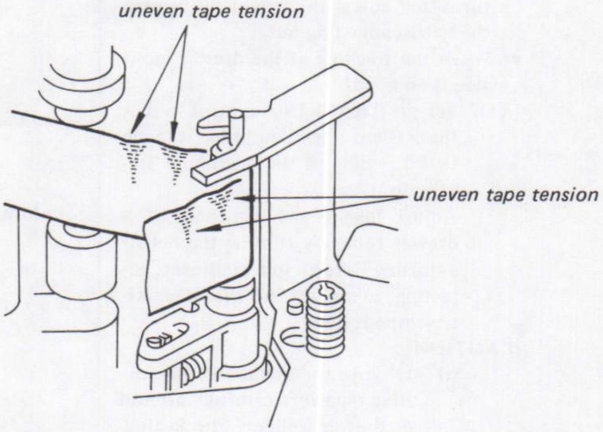
(iii) Check that the tape runs in contact with the upper flange of S drawer roller without tape curl.

(5) When the RF envelope is not flat with step 4), adjust height of TG-III and TG-IV.

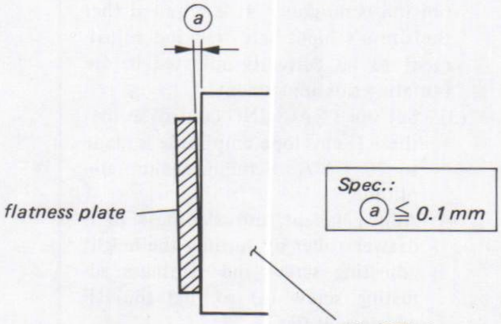
(6) When the RF envelope is not flat with steps 4) and 5), adjust zenith of the audio/CTL head within the allowable range. Adjust height of TG-III and TG-IV once again.

(7) Check that the clearance between the tape bottom edge and the lower flange of threading roller is 0.01 mm ~ 0.15 mm clearance. If not, perform height adjustment of threading roller by turning the threading roller shaft.


TG-II
S drawer roller
slantness adj. screw (a)
height adj. screw


uneven tape tension
uneven tape tension

< zenith adj. for audio/CTL head >


ⓐ
flatness plate
Spec.:
ⓐ ≦ 0.1 mm
audio/CTL head

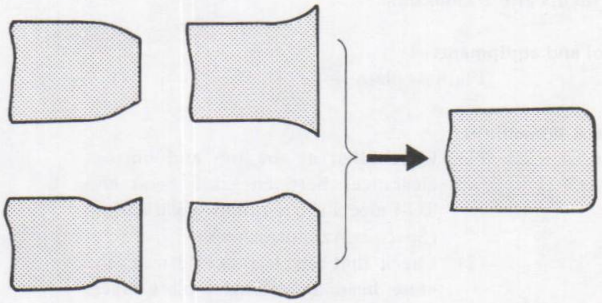
- When the tracking at the drum's exit side is no good.

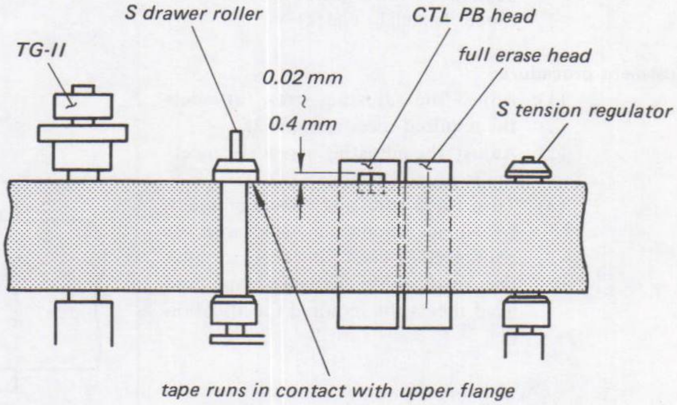
(8) Set the TRACKING control so that the RF envelope amplitude is made to 70 ~ 80% of the maximum amplitude.

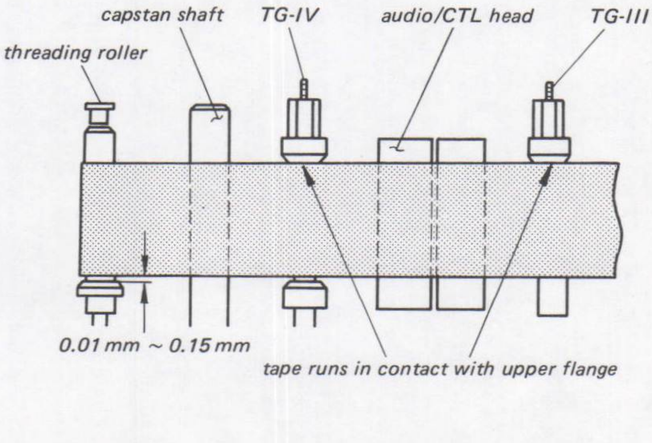
(9) When the RF envelope is not flat as shown in figure 1, adjust height of TG-IV so that the RF envelope is flat. After this adjustment, adjust height of TG-III so that the tape runs in contact with upper flange. When the RF envelope is not flat as shown in figure 2, adjust height of TG-III and TG-IV so that the RF envelope is flat. If it does not with this adjustment, adjust the zenith of the audio/CTL head within the allowable range. Adjust the height of TG-III and TG-IV.

(10) Check that the clearance between the tape bottom edge and the lower flange of threading roller is 0.01 mm ~ 0.15 mm clearance. If not, perform height adjustment of threading roller by turning the threading roller shaft.

< drum exit side >




S drawer roller
CTL PB head
TG-II
full erase head
0.02 mm
0.4 mm
S tension regulator
tape runs in contact with upper flange


capstan shaft
TG-IV
audio/CTL head
TG-III
threading roller
0.01 mm ~ 0.15 mm
tape runs in contact with upper flange

7-8-2. CTL PB Head Height/Azimuth/Zenith Adjustments

- CTL PB head height, azimuth, and zenith adjustments are closely related. If any one of these three adjustments is attempted, perform the rest of two adjustments at the same time.

Tool and equipment:

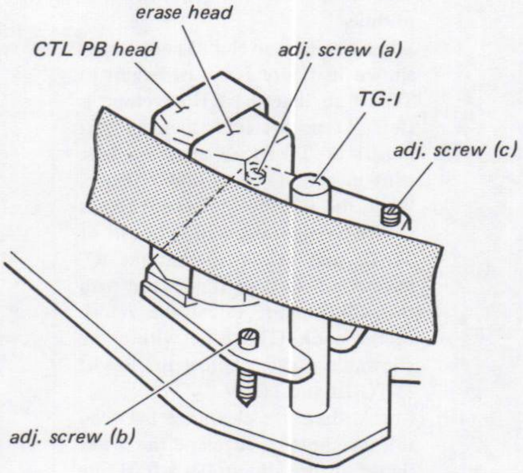
Flatness plate

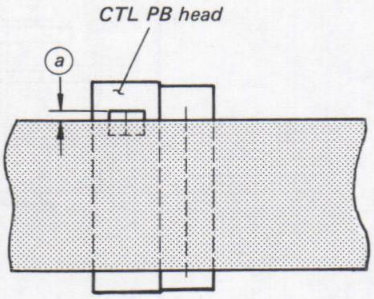
Check procedure:

(1) Check that at the top and bottom clearances between erase head and TG-I meets the required specification. (Spec. 2: Azimuth check)
(2) Check that the clearance between the erase head and flatness plate meets the required specification, when the flatness plate set on the erase head and TG-I. (Spec. 3: Zenith check)
(3) Install a cassette tape, and put the machine into FWD mode.
(4) Check that the relationship between the top edge of tape and CTL PB head meets the required specification. (Spec. 1: Height check)

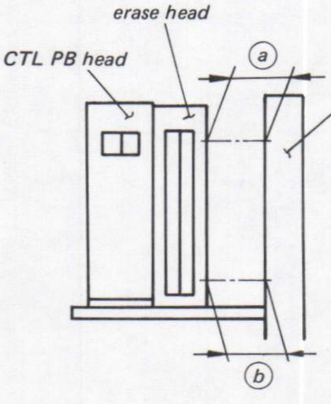
Adjustment procedure:

(1) Adjust the adjusting screw (a) meets the required specification (2).
(2) Adjust the adjusting screw (b) meets the required specification (3).
(3) Turn three adjusting screws of exactly equal amount in clockwise or counterclockwise direction so that the relationship between tape and head meets the required specification (1).

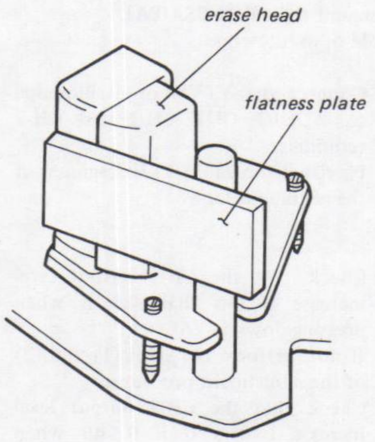


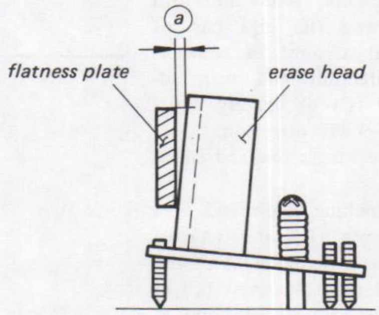


Spec.:
(height)
0.02 mm ≦ ⓐ ≦ 0.4 mm

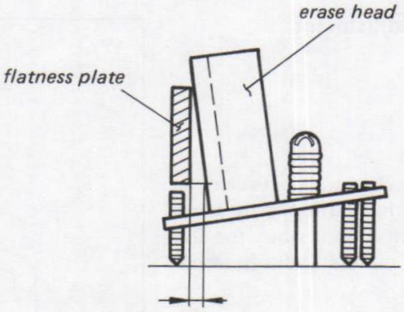


Spec.:
(azimuth)
ⓐ ≑ ⓑ


erase head
flatness plate


ⓐ
flatness plate
erase head

Spec.:
(Zenith)
ⓐ ≦ 0.1 mm


erase head
flatness plate
ⓐ

7-8-3. Audio Head Height Adjustment

Tool and equipment:

Alignment tape, RR5-2SA-PAL
VTVM or oscilloscope

Preparation:

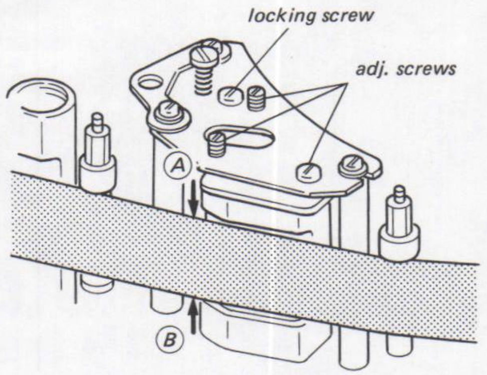
(1) Connect the VTVM or oscilloscope to AUDIO OUT CH-1 and CH-2 terminals.
(2) Playback the audio 1 kHz segment of the alignment tape.

Check procedure:

(1) Check that the CH-1 output level increase is less than 0.5 dB when pressing down at Ⓐ.
If not, perform the steps (1) and (2) of the adjustment procedure.
(2) Check that the CH-2 output level increase is less than 0.5 dB when pushing up at Ⓑ.
If not, perform the steps (3) and (4) of the adjustment procedure.

Adjustment procedure:

(1) Loosen the locking screw and turn adjusting screws (R) and (A) of exactly equal amount in counterclockwise direction and turn adjusting screw (C) of exactly equal amount in clockwise direction.
(2) Tighten the locking screw and check height again.
(3) Loosen the locking screw and turn adjusting screws (R) and (A) of exactly equal amount in clockwise direction and turn the screw (C) of exactly equal amount in counterclockwise direction.
(4) Tighten the locking screw and check height again.



Spec.:
- *CH-1 level increase is less than 0.5 dB when pressing down at Ⓐ portion.*
- *CH-2 level increase is less than. 0.5 dB when pushing up Ⓑ portion.*

7-8-4. Audio Head Zenith Adjustment

Tool and equipment:

Flatness plate

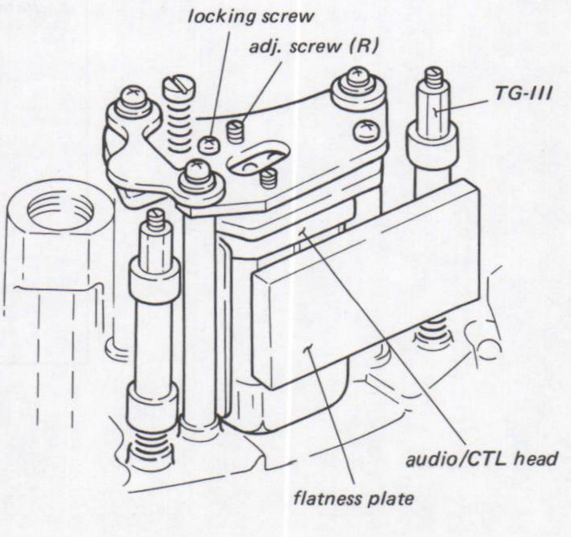
Check procedure:

Check that the clearance between the audio head and the flatness plate meets the required specification, when the flatness plate is set on the audio head and TG-III.

Adjustment procedure:

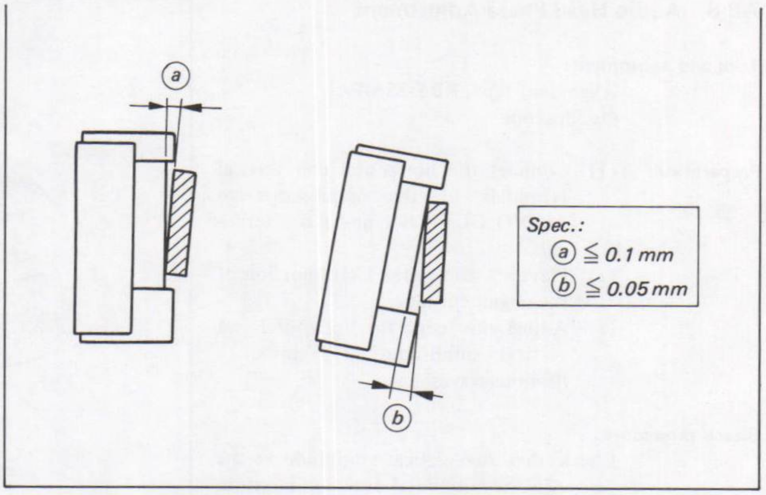
When the clearance is out of spec. at the top portion of the audio head.

(1) Turn the adjusting screw (R) in counterclockwise direction.
(2) Tighten the locking screw and check zenith again.



When the clearance is out of spec. at the bottom portion of the audio head.

(3) Loosen the locking screw ¼ ~ ½ turns.
(4) Turn the adjusting screw (R) in clockwise direction.
(5) Tighten the locking screw and check zenith again.



7-8-5. Audio Head Azimuth Adjustment

Tool and equipment:

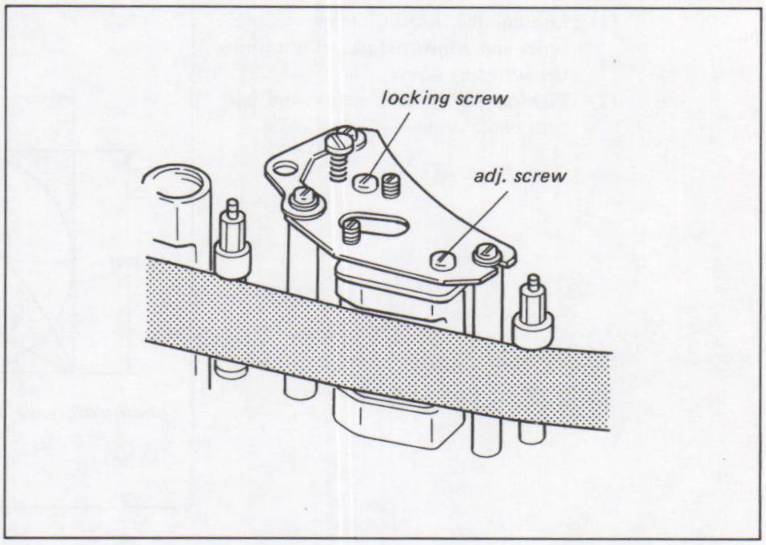
Alignment tape, RR5-2SA-PAL
VTVM or oscilloscope

Preparation:

(1) Connect the VTVM or oscilloscope to AUDIO OUT CH-1 or CH-2 terminal.
(2) Playback the audio 10 kHz portion of the alignment tape.

Adjustment procedure:

(1) Loosen the locking screw and adjust the maximum output level by turning the adjusting screw.
(2) Tighten the locking screw.



7-8-6. Audio Head Phase Adjustment

Tool and equipment:

Alignment tape, RR5-2SA-PAL
Oscilloscope

Preparation:

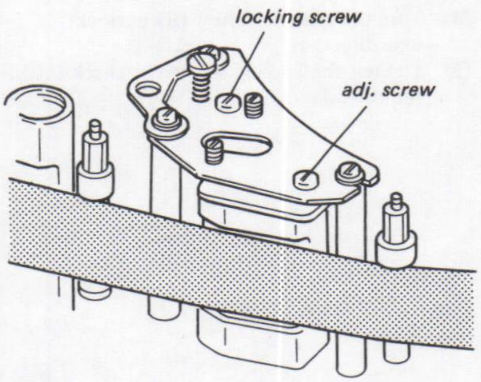
(1) Connect the horizontal and vertical terminals of the oscilloscope to AUDIO OUT CH-1 and CH-2 terminals.
(2) Playback the audio 1 kHz portion of the alignment tape.
(3) Adjust the scope for horizontal and vertical amplitudes of 6 cm of a lissajous waveshape.

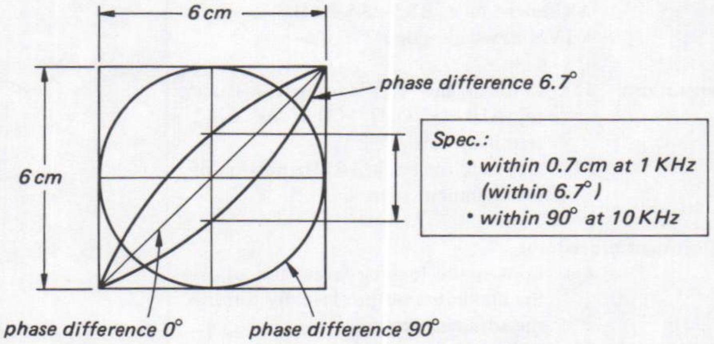
Check procedure:

Check that the vertical amplitude at the center in the horizontal direction is within the specification at 1 kHz and 10 kHz.

Adjustment procedure:

(1) Loosen the locking screw ¼ ~ ½ turns and adjust the phase by turning the adjusting screw.
(2) Tighten the locking screw and confirm phase again.


locking screw
adj. screw


6 cm
6 cm
phase difference 6.7°
Spec.:
• within 0.7 cm at 1 KHz
(within 6.7°)
• within 90° at 10 KHz
phase difference 0°
phase difference 90°

7-8-7. Audio/CTL Head Position Adjustment

- **The video head track width of this set is 105μm, but the recorded video track width on the alignment tape is 85μm. Therefore this CTL head position adjustment of this set is not perfect from the ordinary U-matic VTR's adjustment. Be sure to perform the following check/adjustment steps.**

Tool and equipment:

Alignment tape, RR5-2SA-PAL
Oscilloscope

Preparation:

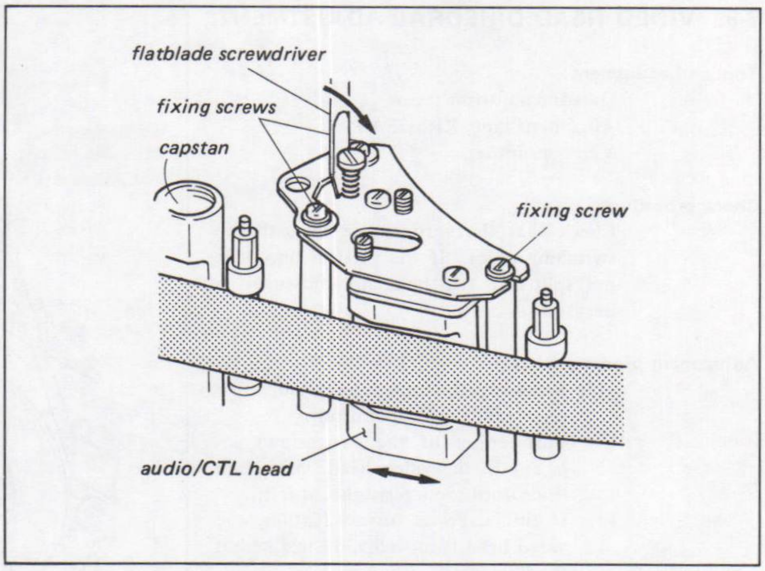
(1) Connect the oscilloscope to TP17/MP-12A board, TP2/SV-31A board, EXT.TRIG. from TP11/SV-31A board.
(2) Playback the color bar segment of the alignment tape.

Check procedure:

(1) Set the TRACKING control to its center click (detent) position.
(2) Turn the TRACKING control in counterclockwise direction until the waveform at TP17/MP-12A board is just before starting to decrease from the maximum amplitude, check that the waveform at TP2/SV-31A advances 1.2 ± 0.3 msec. from the step (1) position.
(3) Turn the TRACKING control in clockwise direction until the waveform at TP17/MP-12A board is just before starting to decrease from the maximum amplitude, check that the waveform at TP2/SV-31A is delayed. 1.2 ± 0.3 msec. from the step (1) position.

Adjustment procedure:

(1) Turn the TRACKING control in counterclockwise direction until the waveform at TP17/MP-12A advance 1.2 msec. from the step (1) position of check procedure.
(2) Loosen the three fixing screws.
(3) Move the CTL head block toward the capstan shaft as far as it will go, and install the flatblade screwdriver as shown in figure. Move the screwdriver in the arrow direction. Stop the movement of the screwdriver when the RF envelope waveform just turn into the maximum amplitude.
(4) Check the CTL head position meets the specifications according to steps (2) and (3) of check procedure.
(5) Tighten the fixing screws of the CTL head block.
(6) Check again that the CTL head position meets the specifications.



7-9. VIDEO HEAD DIHEDRAL ADJUSTMENT

Tool and equipment:

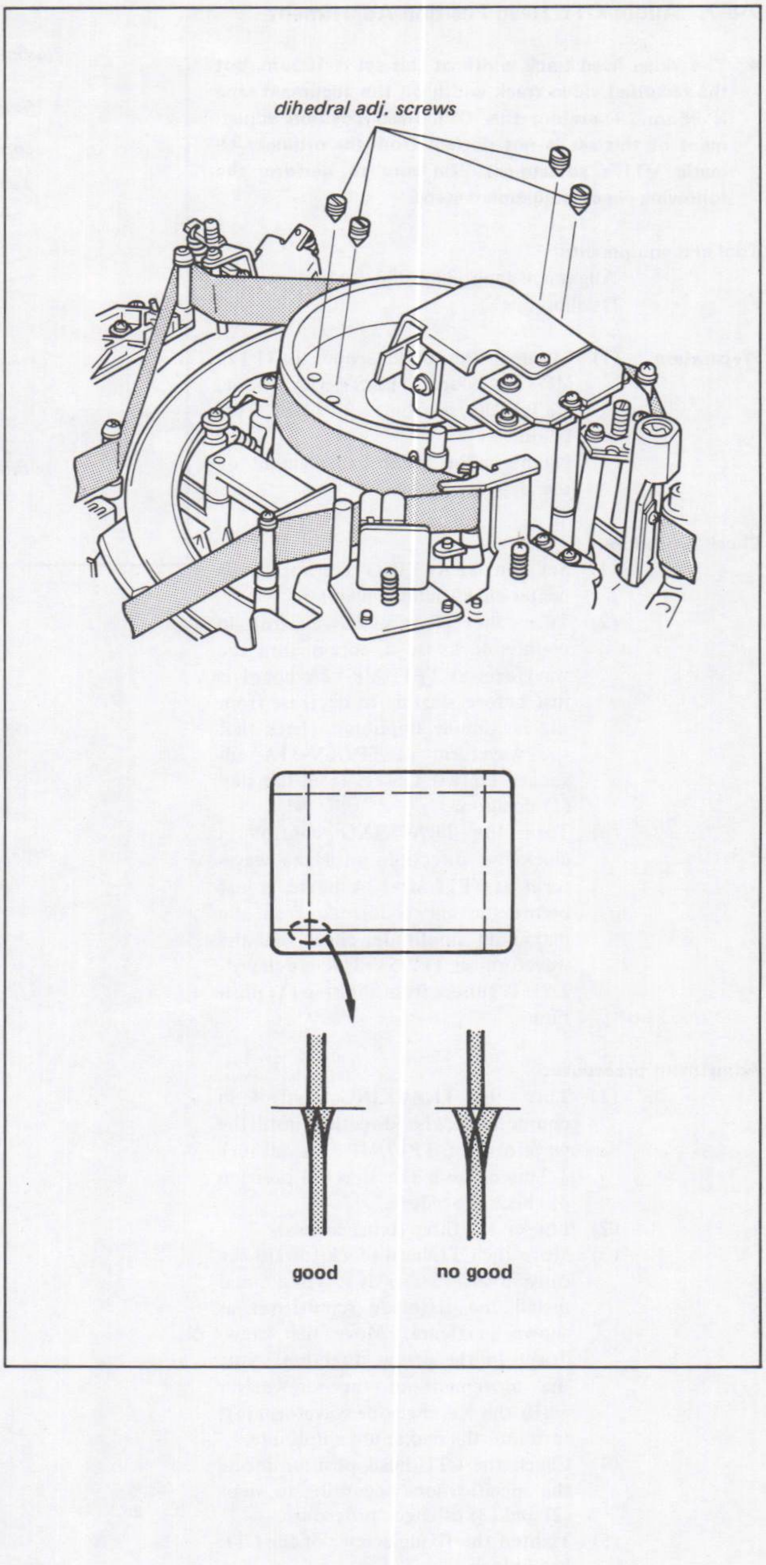
Dihedral adjusting screw
Alignment tape, RR5-2SA-PAL
Video monitor

Check procedure:

Check that the vertical line beneath the switching point. If the vertical line does not split into two lines, no adjustment is necessary.

Adjustment procedure:

(1) Screw lightly four dihedral adjusting screws into the upper drum.
(2) Turn either of the two screws adjacent to the video head with white leads until some resistance is felt.
(3) If this screw is turned further, the video head is moved and the dihedral is adjusted.
Therefore, turn this screw an additional quarter turn.
(4) Check for dihedral distortion. If the distortion has gotton worse, turn this screw back one turn and tighten the other screw a quarter turn. Check again for dihedral distortion and continue in this way until dihedral error is eliminated.
(5) When the adjustment is completed, remove the four dihedral adjusting screws. After removal, playback the alignment tape and check dihedral again as error sometimes reappears after screws are removed.



SECTION 8

POWER SUPPLY AND SYSTEM CONTROL ALIGNMENT

8-1. REG 12 V ADJUSTMENT (SWITCHING REGULATOR)

machine conditions for adjustment	**spec.**	**adjustment**
• More than 5 minutes should be elapsed after POWER ON. • Any mode.	CN201-1/UR-02 12.0 V ± 0.1 V dc	⊘ RV301/M (UR-02)

NOTE: If the REG 12 V adjustment is attempted, re-alignment of the video system and servo system are required. Do not attempt adjustment to the REG 12 V power supply unless machine performance is obviously poor due to incorrect power supply voltage. If adjustments are made to the power supply, re-alignment of the video and servo systems are necessary.

8-2. REG 5 V ADJUSTMENT FOR SYSTEM CONTROL

machine conditions for adjustment	**spec.**	**adjustment**
• POWER ON. • STOP mode.	TP2/SY-68A 5.2 V ± 0.05 V dc	⊘ RV1/SY-68A

8-3. TAPE SENSOR BALANCE ADJUSTMENT

machine conditions for adjustment	**spec.**	**adjustment**
• STOP mode. • Short between CN13-2 and CN13-3 on SY-68A board with jumper lead.	TP11/SY-68A 6.0 V ± 0.2 V dc	⊘ RV2/SY-68A

SECTION 9

SERVO SYSTEM ALIGNMENT

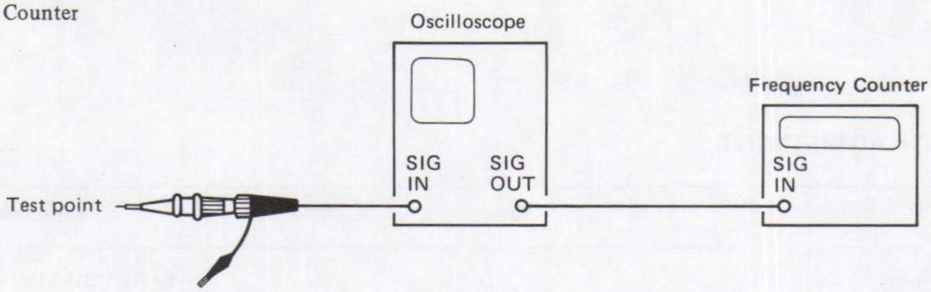
[Equipment Required]

- Alignment Tape; RR5-2SA-PAL (Part No.: 8-960-015-63) or
  RR5-1SC-PAL (Part No.: 8-960-035-61)

RR5-2SA-PAL

Real Time Counter (min.)	Tape Counter	Video Track	Audio Track
00:00 – 04:00	000 – 100	Monoscope	3 KHz, 0 dB
04:00 – 09:00	100 – 208	Color-bar	———
09:00 – 14:00	208 – 300	R-F sweep	———
14:00 – 16:00	300 – 335	Mod. 20T pulse	1 KHz, 0 dB
16:00 – 18:00	335 – 367	M.S. w/burst	10 KHz, –10 dB
18:00 – 20:00	367 – 398	Pseudo C.B. for DOC adj.	———

- Blank Tape; KCA-60, KCS-20
- Dual Trace Oscilloscope
- Frequency Counter



NOTE: SEARCH mode.

search speed	at TP23/SV-31A
x 1/30	200 Hz ± 5%
x 1/10	600 Hz ± 5%
x 1/5	1.2 KHz ± 5%
x 1/2	3 KHz ± 5%
x 1	6 KHz ± 5%
x 2	12 KHz ± 5%
x 5	30 KHz ± 5%

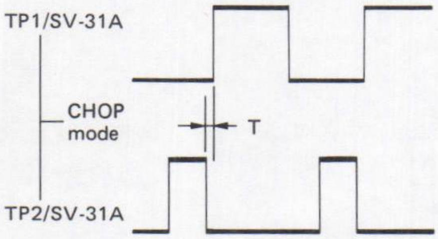
9-1. VCC ADJUSTMENT FOR SERVO IC

machine conditions for adjustment	spec.	adjustment
• More than 5 minutes should be elapsed after POWER ON. • STOP (E-E) mode.	IC7-10/SV-31A (TP-37) 5.0 V ± 0.1 V dc	⊘RV17/SV-31A

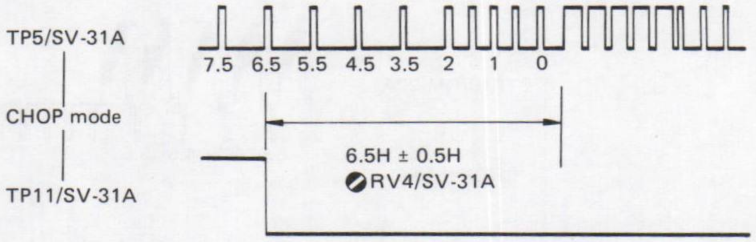
9-2. AUDIO/CTL HEAD POSITION ADJUSTMENT

Refer to Sec. 7-8-7.

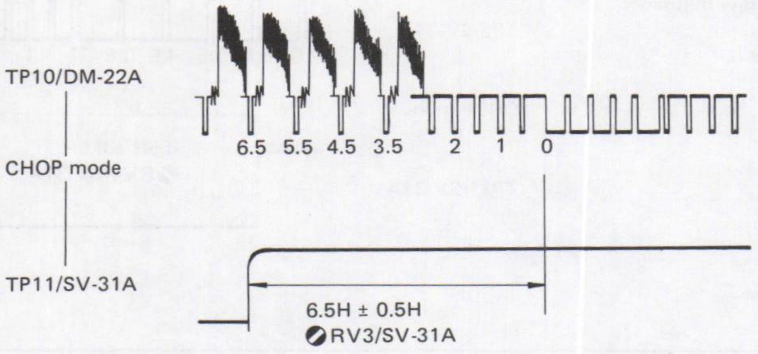
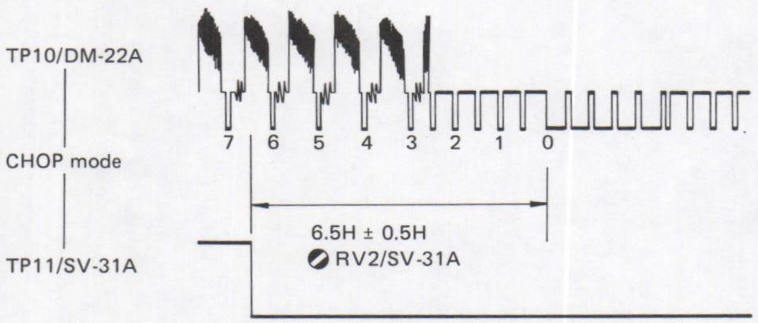
9-3. TRACKING MULTI ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Playing back the Alignment Tape. • Set the TRACKING control to its center detent.	 T = 0	⊘ RV1/SV-31A TRIG; TP1/SV-31A

9-4. DRUM ϕ^2 ADJUSTMENT

machine conditions for adjustment	**spec. & adjustment**
• VIDEO IN; color video signal. • Short between TP6 and E1 of SV-31A board with jumper lead. • Record mode.	 TP5/SV-31A 7.5 6.5 5.5 4.5 3.5 2 1 0 CHOP mode 6.5H ± 0.5H ⊘RV4/SV-31A TP11/SV-31A TRIG; TP1/SV-31A

9-5. SWITCHING POSITION ADJUSTMENT

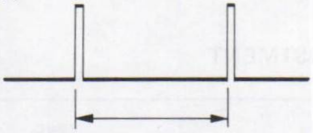
machine conditions for adjustment	spec. & adjustment
• Playing back the color bar segment of Alignment Tape.	**EVEN Field**  TP10/DM-22A 6.5 5.5 4.5 3.5 2 1 0 CHOP mode TP11/SV-31A 6.5H ± 0.5H RV3/SV-31A **ODD Field**  TP10/DM-22A 7 6 5 4 3 2 1 0 CHOP mode TP11/SV-31A 6.5H ± 0.5H RV2/SV-31A TRIG; TP1/SV-31A

9-6. CAPSTAN SEARCH x 1 SPEED ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Playing back the audio 3 kHz segment of Alignment Tape. • SEARCH *FWD x 1 speed.	AUDIO LINE OUT 3,020 Hz ~ 3,040 Hz	⊘ RV15/SV-31A

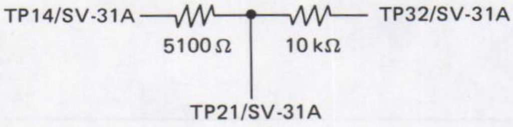
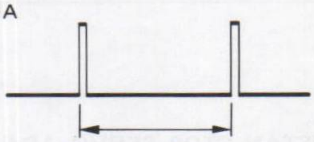
NOTE: *FWD x 1 speed: refer to page 9-1.

9-7. CAPSTAN SEARCH x 1/30 SPEED ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Playing back the audio 3 kHz segment of Alignment Tape. • SEARCH *FWD x 1/30 speed.	TP30/SV-31A  	⊘ RV10/SV-31A TRIG; INT

NOTE: *FWD x 1/30 speed: refer to page 9-1.

9-8. CAPSTAN SEARCH x 1/15 SPEED ADJUSTMENT

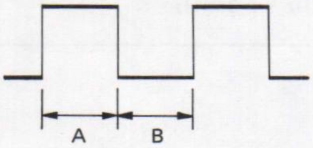
machine conditions for adjustment	spec. & adjustment
• Temporarily connect (Search x 1/15 mode)  TP14/SV-31A 5100 Ω 10 kΩ TP32/SV-31A TP21/SV-31A • Playing back the Alignment Tape. • PLAY PAUSE mode.	TP30/SV-31A  ⊘ RV11/SV-31A TRIG; INT

9-9. CAPSTAN SEARCH x 1/2 SPEED ADJUSTMENT

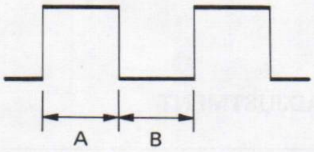
machine conditions for adjustment	spec.	adjustment
• Playing back the audio 3 kHz segment of Alignment Tape. • SEARCH *FWD x 1/2 speed.	TP35/SV-31A Adjust RV16/SV-31A so that the transition point of level change from LOW level to HIGH level.	⊘ RV16/SV-31A

NOTE: *FWD x 1/2 speed: refer to page 9-1.

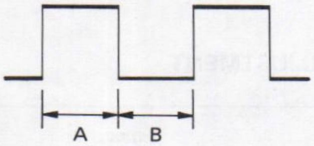
9-10. CAPSTAN FWD/REV DETECTOR ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Playing back the Alignment Tape. • SEARCH FWD x 5 speed (SEARCH DIAL fully clockwise)	TP33/SV-31A  A ≑ B	⊘ RV14/SV-31A TRIG; TP33/SV-31A

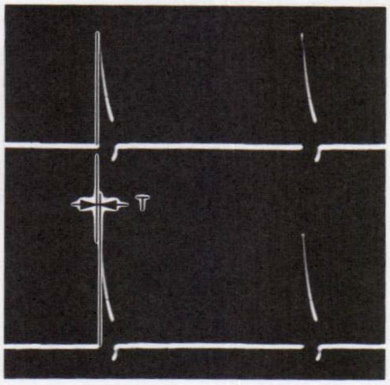
9-11. CAPSTAN FREE SPEED ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• VIDEO IN; color video signal. • Record mode.	TP16/SV-31A  A = B	⊘ RV9/SV-31A TRIG; INT

9-12. CAPSTAN STOP SERVO ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• VIDEO IN; color video signal. • Record mode.	TP17/SV-31A (STOP SERVO-1) TP18/SV-31A (STOP SERVO-2)  A = B	STOP SERVO-1 ⊘ RV12/SV-31A STOP SERVO-2 ⊘ RV13/SV-31A TRIG; INT

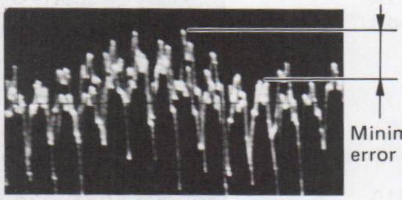
9-13. DRUM AFC BIAS ADJUSTMENT

machine conditions for adjustment	**spec. & adjustment**
• Alignment Tape Playback and SEARCH STILL modes.	TP6/SV-31A (FWD mode) TP6/SV-31A (SEARCH STILL mode)  T = 0 ± 0.1μsec. ⊘ RV8/SV-31A TRIG; INT

9-14. DRUM AFC TRANSIENT ADJUSTMENT

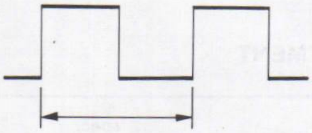
machine conditions for adjustment	**spec.**	**adjustment**
• Alignment Tape Playback and SEARCH STILL modes.	TP7/SV-31A SEARCH STILL mode = 2.0 V (REF) FWD mode = (REF) ± 0.1 V	⊘ RV5/SV-31A

9-15. PICTURE SPLITTING COMPENSATOR ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Playing back the Alignment Tape.	TP10/SV-31A  Minimize the error voltage	⊘ RV6. RV7/SV-31A TRIG; TP1/SV-31A

9-16. REEL SERVO ADJUSTMENT

9-16-1. x 10 Picture Search Speed Adjustment

machine conditions for adjustment	spec.	adjustment
• Playing back the Alignment Tape. • FWD x 10 Picture Search mode.	TP2/SV-31A  4.0 msec. ± 0.2 msec.	⊘ RV3/MR-6 TRIG; INT

NOTE: In x 10 Picture Search mode, the pinch roller is apart from the capstan and the 10 times picture appears on the monitor in FWD and REV SEARCH mode.

** When VTR is operated in x 10 Picture Search mode, RM-440 remote controller is used. At this time, RM-440 SEARCH DIAL is turned fully clockwise (FWD SEARCH mode) or fully counter-clockwise (REV SEARCH mode).

If RM-440 is not available, × 10 Picture Search mode is set up as the following process.

S/N up to 10180 (AEP)	**S/N 10181 and later** **S/N 10021 and later**
• Temporarily connect 10 kΩ Resistor between IC101-4 and IC23-2 of SY-68A board. • Unsolder between IC101-4 and IC23-2 of SY-68A board. • Short between IC23-2 and E8 of SY-68A board with jumper lead. • Connect 10 kΩ Resistor between IC119-10 and IC25-6 of SY-68A board. • Unsolder between IC119-10 and IC25-6 of SY-68A board. • Short between IC25-6 and E8 of SY-68A board with jumper lead. • Short between CN23-11 and E8 of SY-68A board with jumper lead. • Short between CN22-5 and E8 or +5 V with jumper lead. Short between CN22-5 and E8; REV mode. Short between CN22-5 and +5 V; FWD mode.	• Temporarily connect 10 kΩ Resistor between IC136-4 and IC33-6 of SY-68A board. • Unsolder between IC136-4 and IC33-6 of SY-68A board. • Short between IC33-6 and E8 of SY-68A board with jumper lead. • Connect 10 kΩ Resistor between IC134-3 and IC32-4 of SY-68A board. • Unsolder between IC134-3 and IC32-4 of SY-68A board. • Short between IC32-4 and E8 of SY-68A board with jumper lead. • Short between CN23-11 and E8 of SY-68A board with jumper lead. • Short between CN22-5 and E8 or +5 V with jumper lead. Short between CN22-5 and E8; REV mode. Short between CN22-5 and +5 V; FWD mode.

After × 10 Picture Search Speed is adjusted, the reset circuit is made to original.

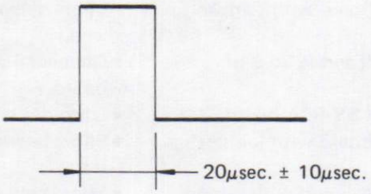
9-16-2. Still Speed Adjustment

machine conditions for adjustment	**spec.**	**adjustment**
• PAUSE or SEARCH STILL mode	**Collector/Q26 on MR-6 board** 0.4 V ± 0.1 V dc	⊘ RV4/MR-6 (RS-6)

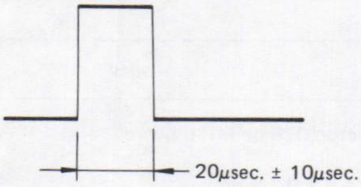
NOTE: FWD torque Adjustment (RV1/MR-6) and REV torque Adjustment (RV2/MR-6).
Refer to Mechanical Alignment Sec. 6-3 and 6-4.

9-17. COLOR FRAMING ADJUSTMENT

9-17-1. Ref. 135° Burst Pulse Width Adjustment

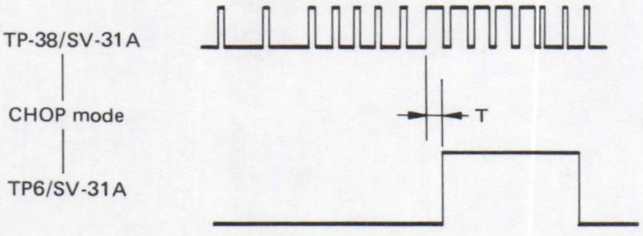
machine conditions for adjustment	spec.	adjustment
• VIDEO IN; color bar signal. • STOP (E-E) mode.	TP4/CF-7 	⊘RV2/CF-7 TRIG; INT

9-17-2. PB 135° Burst Pulse Width Adjustment

machine conditions for adjustment	spec.	adjustment
• Playing back the color bar segment of Alignment Tape.	TP2/CF-7 	⊘RV1/CF-7 TRIG; INT

9-18. REC VD ADJUSTMENT

NOTE: 1. Perform adjustments of section 9-4. (Drum ϕ^2) and 9-5. (Switching Position) before this adjustment.
2. Applicable serial No. 17011 and later (AEP) (P.C. board part No. 1-603-738-25 and later)
11351 and later (UK)

machine conditions for adjustment	spec. & adjustment
• VIDEO IN; color video signal. • Record mode.	 T = 0 ± 5 µs ⊘RV18/SV-31A TRIG; TP1/SV-31A

SECTION 10

AUDIO SYSTEM ALIGNMENT

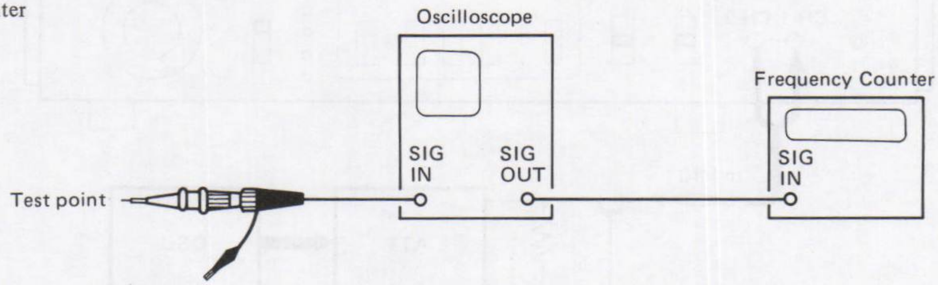
[Equipment Required]

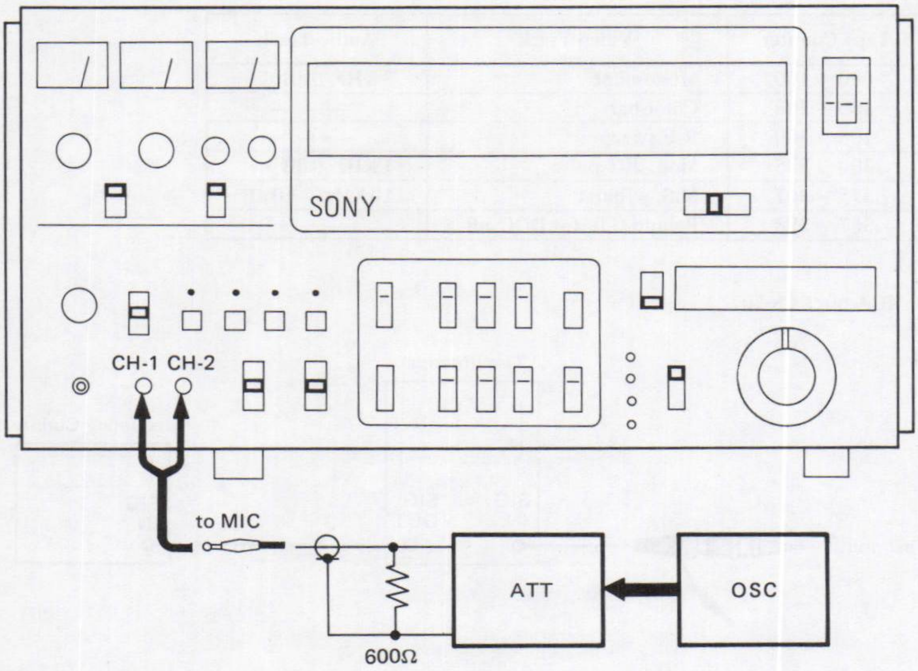
- Alignment Tape; RR5-2SA-PAL (Part No.: 8-960-015-63) or
  RR5-1SC-PAL (Part No.: 8-960-035-01)

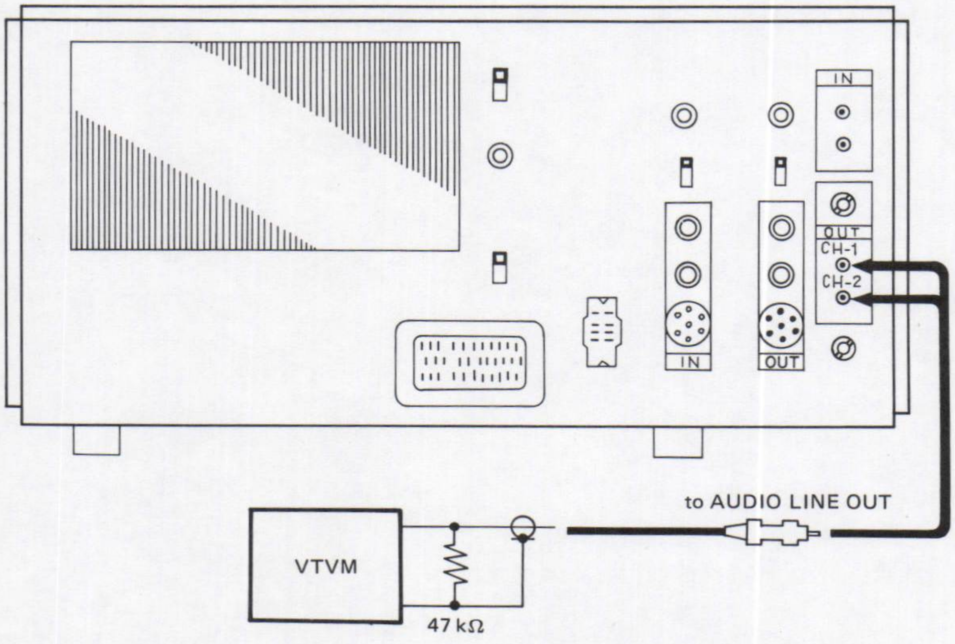
RR5-2SA-PAL

Real Time Counter (min.)	Tape Counter	Video Track	Audio Track
00:00 – 04:00	000 – 100	Monoscope	3 KHz, 0 dB
04:00 – 09:00	100 – 208	Color-bar	———
09:00 – 14:00	208 – 300	R-F sweep	———
14:00 – 16:00	300 – 335	Mod. 20T pulse	1 KHz, 0 dB
16:00 – 18:00	335 – 367	M.S. w/burst	10 KHz, –10 dB
18:00 – 20:00	367 – 398	Pseudo C.B. for DOC adj.	———

- Blank Tape; KCA-60, KCS-20
- Oscilloscope
- Frequency Counter


Oscilloscope
Frequency Counter
SIG IN
SIG OUT
SIG IN
Test point

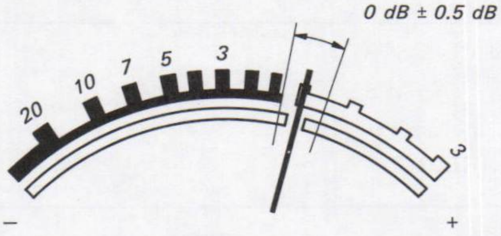

SONY
CH-1
CH-2
to MIC
ATT
OSC
600Ω


IN
OUT
CH-1
CH-2
IN
OUT
to AUDIO LINE OUT
VTVM
47 kΩ

10-1. PB OUTPUT FREQUENCY RESPONSE ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Playing back the 1 kHz and 10 kHz segments of Alignment Tape	LINE OUT (terminated by 47 kohm) (1 kHz Level = Ref. Level) 10 kHz Level = (Ref. Level) – 10 dB ± 0.5 dB	⊘RV1/AU-21 (CH-1) ⊘RV201/AU-21 (CH-2)

10-2. "AUDIO LEVEL" CONTROL SETTING/METER CALIBRATION ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• MIC IN; 1 kHz, –60 dB • LIMITER sw; OFF • STOP (E-E) mode.	LINE OUT (terminated by 47 kohm) –5 dB ± 0.5 dB (CH-1 = CH-2)	⊘AUDIO LEVEL VR (CH-1/CH-2)
	AUDIO METER  	⊘RV4/AU-21 (CH-1) ⊘RV204/AU-21 (CH-2)

NOTE: The AUDIO LEVEL control should not be touched until rest of Sec. 10 Audio System Alignment are completed.

10-3. PB OUTPUT LEVEL ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Playing back the 1 kHz segment of Alignment Tape	LINE OUT (terminated by 47 kohm) –5 dB ± 0.5 dB (CH-1 = CH-2)	⊘RV2/AU-21 (CH-1) ⊘RV202/AU-21 (CH-2)

10-4. AUDIO BIAS, ERASE FREQUENCY ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• AUDIO IN; no signal input. • Record mode.	TP503/AU-21 71 kHz ± 0.2 kHz	⊘LV501/AU-21

10-5. AUDIO BIAS CURRENT ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• MIC IN; 1 kHz/10 kHz, −80 dB. • Record and Playback mode.	LINE OUT (terminated by 47 kohm) $\left(\begin{array}{l}\text{10 kHz}\\\text{REC/PB LEVEL}\end{array}\right)=\left(\begin{array}{l}\text{1 kHz}\\\text{REC/PB LEVEL}\end{array}\right) \pm 0.5\,\text{dB}$ • Increasing the BIAS voltage by 1 V (rms) (measured at TP501/AU-21 for CH-1, TP502/AU-21 for CH-2) corresponds to the decrease of 0.4 dB of the 10 kHz REC/PB level.	⊘ CV501-A/AU-21 (CH-1) ⊘ CV501-B/AU-21 (CH-2)

10-6. BIAS TRAP ADJUSTMENT [REC]-1

machine conditions for adjustment	spec.	adjustment
• AUDIO IN; no signal input. • Record mode.	TP4/AU-21 (CH-1) TP204/AU-21 (CH-2) Adjust for minimum signal amplitude.	⊘ LV3/AU-21 (CH-1) ⊘ LV203/AU-21 (CH-2)

10-7. BIAS TRAP ADJUSTMENT [REC]-2

machine conditions for adjustment	spec.	adjustment
• AUDIO IN; no signal input. • Record mode.	TP1/AU-21 (CH-1) TP201/AU-21 (CH-2) Adjust for minimum signal amplitude.	⊘ LV1/AU-21 (CH-1) ⊘ LV201/AU-21 (CH-2)

10-8. AUDIO LIMITER GAIN ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• MIC IN; 1 kHz, −30 dB • LIMITER sw; ON • STOP (E-E) mode.	LINE OUT (terminated by 47 kohm) −2 dB ± 0.5 dB (CH-1 = CH-2)	⊘ RV3/AU-21 (CH-1) ⊘ RV203/AU-21 (CH-2)

10-9. REC LEVEL ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• MIC IN; 1 kHz, −60 dB • LIMITER sw; OFF • Record and Playback mode.	LINE OUT (terminated by 47 kohm) The self record/playback level should be −5 dB ± 0.5 dB (The level difference between CH-1 and CH-2 should be less then 0.5 dB) If adjustment is found to be necessary, increase or decrease the E-E signal level at TP5/AU-21 (CH-1) or TP205/AU-21 (CH-2) during E-E mode, by the same signal level as is found to be adjusted in the self record/playback procedure.	⊘ RV5/AU-21 (CH-1) ⊘ RV205/AU-21 (CH-2)

10-10. INSERT BIAS FREQUENCY ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• AUDIO IN; no signal input. • AUDIO INSERT mode. (CH-1/CH-2)	TP503/AU-21 CH-1 INSERT mode (CH-2 .... OFF) CH-2 INSERT mode (CH-1 .... OFF) 71 kHz ± 0.2 kHz	⊘ LV502/AU-21 (CH-1) ⊘ LV503/AU-21 (CH-2)

10-11. INSERT BIAS TRAP ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
• Using a blank tape that has no audio pre-recording. • AUDIO INSERT mode. (CH-1/CH-2)	TP202/AU-21 (CH-2) CH-1 INSERT mode (CH-2 .... OFF) Minimize the signal amplitude (bias leak).	⊘ LV202/AU-21 (CH-2)
	TP2/AU-21 (CH-1) CH-2 INSERT mode (CH-1 .... OFF) Minimize the signal amplitude (bias leak)	⊘ LV2/AU-21 (CH-1)

10-12. CROSS-TALK CANCEL ADJUSTMENT

machine conditions for adjustment	spec.	adjustment
● MIC IN; 5 kHz, –60 dB. ● Using an audio blank tape. ● AUDIO INSERT mode. (CH-1/CH-2)	LINE OUT (CH-2) CH-1 INSERT mode (CH-2 .... OFF) Minimize the signal amplitude (cross-talk)	⊘ RV6/AU-21 (CH-1)
	LINE OUT (CH-1) CH-2 INSERT mode (CH-1 .... OFF) Minimize the signal amplitude (cross-talk)	⊘ RV206/AU-21 (CH-2)

SECTION 11

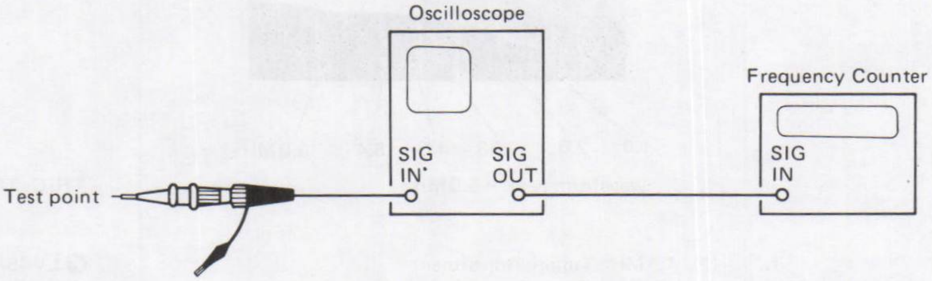
VIDEO SYSTEM ALIGNMENT

[Equipment Required]

- Dual Trace Oscilloscope
- Frequency Counter
- Video Sweep Generator (with Burst)
- Blank Tape; KCA-60 (SONY standard product)
- Alignment Tape; RR5-2SA-PAL (Part No.: 8-960-015-63) or RR5-1S-PAL (Part No.: 8-960-015-61)

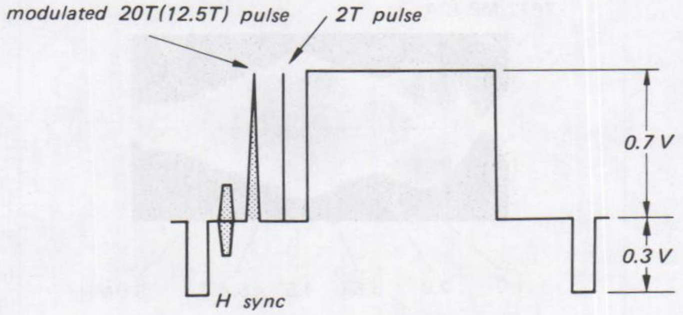
RR5-2SA-PAL

Real Time Counter (min.)	Tape Counter	Video Track	Audio Track
00:00 – 04:00	000 – 100	Monoscope	3 KHz, 0 dB
04:00 – 09:00	100 – 208	Color-bar	—
09:00 – 14:00	208 – 300	R-F sweep	—
14:00 – 16:00	300 – 335	Mod. 20T pulse	1 KHz, 0 dB
16:00 – 18:00	335 – 367	M.S. w/burst	10 KHz, –10 dB
18:00 – 20:00	367 – 398	Pseudo C.B. for DOC adj.	—

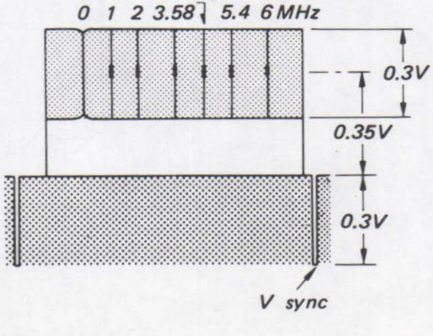

Oscilloscope
Frequency Counter
SIG IN
SIG OUT
SIG IN
Test point

[Video Signals Required]

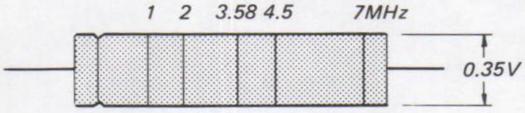
- Color Bar Signal; 75% color bar signal
- Color Video Signal; Any video signal that has the CCIR specified subcarrier and sync signals.
- Sin² wave signal;


modulated 20T(12.5T) pulse
2T pulse
0.7 V
0.3 V
H sync

- Gated Sweep Signal;

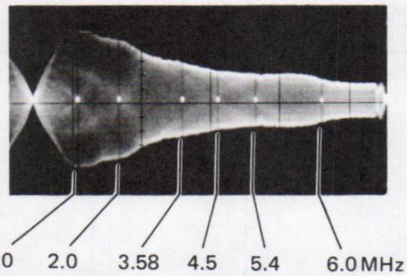
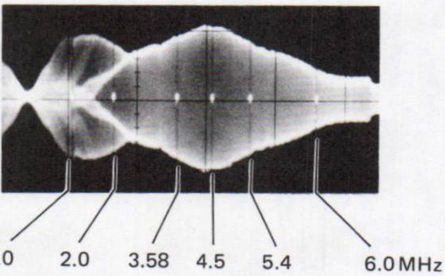

0
1
2
3.58
4.5
5.4
6 MHz
0.3V
0.35V
0.3V
V sync

- Sweep Signal;


1
2
3.58
4.5
7MHz
0.35V

11-1. PLAYBACK RF AMPLIFIER ADJUSTMENT

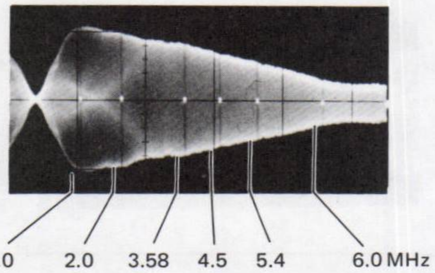
11-1-1. PB RF Frequency Response Adjustment

machine conditions for adjustment	**spec.**	**adjustment**
• Playing back the RF SWEEP segment of Alignment Tape. • Short between TP6 and E1 of SV-31A board with jumper lead. • Set the TRACKING control to its center detent.	(1) 6.0 MHz Tuning Adjustment RV13, RV15/MP-12A (CH-A) RV12, RV14/MP-12A (CH-B) ↺ fully counter-clockwise TP14 (CH-A), TP13 (CH-B)/MP-12A  waveform peak = 6.0 MHz	⊘ CV3/MP-12A (CH-A) ⊘ CV2/MP-12A (CH-B) TRIG; TP1/SV-31A
	(2) 4.5 MHz Tuning Adjustment RV13/MP-12A (CH-A) > ↺ fully counter-clockwise RV12/MP-12A (CH-B) RV15/MP-12A (CH-A) > ↻ fully clockwise RV14/MP-12A (CH-B) TP17/MP-12A  waveform peak = 4.5 MHz	⊘ LV45/MP-12A (CH-A) ⊘ LV43/MP-12A (CH-B) TRIG; TP1/SV-31A

<table>
<tr>
<td></td>
<td>

(3) Frequency Response Adjustment

TP17/MP-12A



<table>
<tr><td>2.2 MHz</td><td>3.58 MHz</td><td>5.4 MHz</td><td>6.0 MHz</td></tr>
<tr><td>100%
REF</td><td>100%
±10%</td><td>75%
±10%</td><td>60%
±5%</td></tr>
</table>

Adjust both the CH-A and CH-B waveforms meet the required specifications.

</td>
<td>

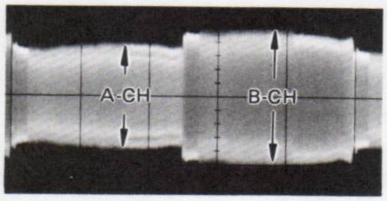
high freq. range adj.
⊘RV13/MP-12A (CH-A)
⊘RV12/MP-12A (CH-B)

middle freq. range adj.
⊘RV15/MP-12A (CH-A)
⊘RV14/MP-12A (CH-B)

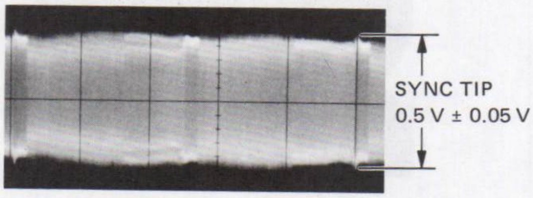
TRIG; TP1/SV-31A

</td>
</tr>
</table>

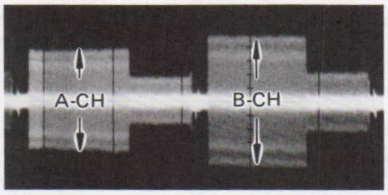
11-1-2. PB Y-RF Output Balance Adjustment

machine conditions for adjustment	spec.	adjustment
• Playing back the color bar segment of Alignment Tape. • Set the TRACKING control to its center detent.	TP17/MP-12A  CH-A Level = CH-B Level	⊘RV16/MP-12A TRIG; TP1/SV-31

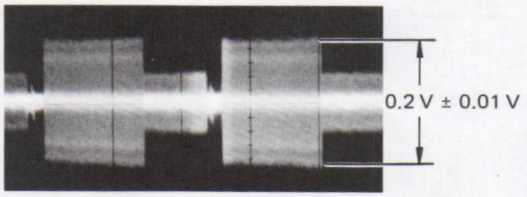
11-1-3. PB Y-RF Output Level Adjustment

machine conditions for adjustment	spec.	adjustment
• Playing back the color bar segment of Alignment Tape. • Set the TRACKING control to its center detent.	TP17/MP-12A 	⊘ RV19/MP-12A TRIG; TP1/SV-31A

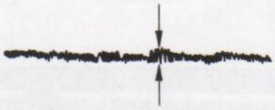
11-1-4. PB Chroma-RF Output Balance Adjustment

machine conditions for adjustment	spec.	adjustment
• Playing back the color bar segment of Alignment Tape. • Set the TRACKING control to its center detent.	TP14/DM-22A  CH-A Level = CH-B Level	⊘ RV20/MP-12A TRIG; TP1/SV-31A

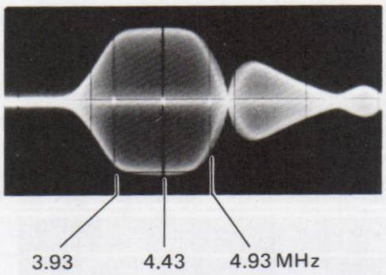
11-1-5. PB Chroma-RF Output Level Adjustment

machine conditions for adjustment	spec.	adjustment
• Playing back the color bar segment of Alignment Tape. • Set the TRACKING control to its center detent.	TP14/DM-22A 	⊘ RV18/MP-12A TRIG; TP1/SV-31A

11-1-6. Chroma-RF Bias Trap Adjustment

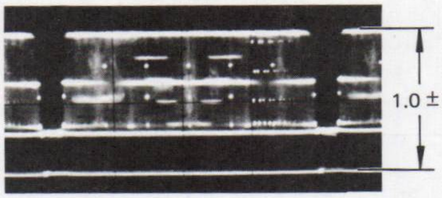
machine conditions for adjustment	**spec.**	**adjustment**
- Playing back the blank tape. - AUDIO CH-1 INSERT mode.	TP24/MP-12A  Minimize the amplitude	⊘ LV52/MP-12A

11-1-7. PB Chroma Frequency Response Adjustment

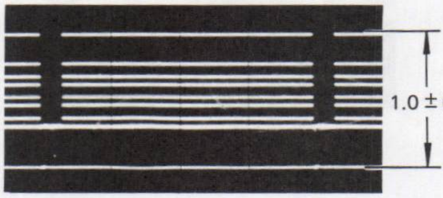
machine conditions for adjustment	**spec.**	**adjustment**
- VIDEO IN; Gated Sweep signal (with Burst) - VIDEO LEVEL sw; AUTO - 75Ω sw; ON - Self-Record and then Playback mode.	TP15/DM-22A  Flaten the waveform between 3.93 MHz and 4.93 MHz.	⊘ RV17/MP-12A TRIG; TP1/SV-31A

11-2. Y DEMODULATOR ADJUSTMENT

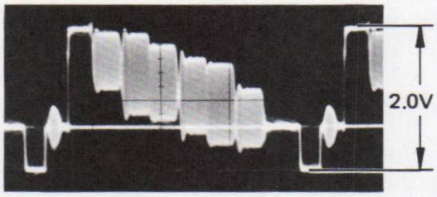
11-2-1. B/W Mode VIDEO Output Level Adjustment

machine conditions for adjustment	spec.	adjustment
• Playing back the Monoscope segment of Alignment Tape. • Set the TRACKING control to its center detent.	TP2/DM-22A 	⊘ RV6/DM-22A TRIG; TP1/SV-31A

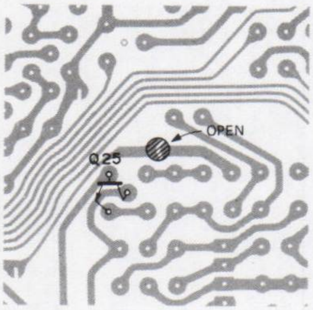
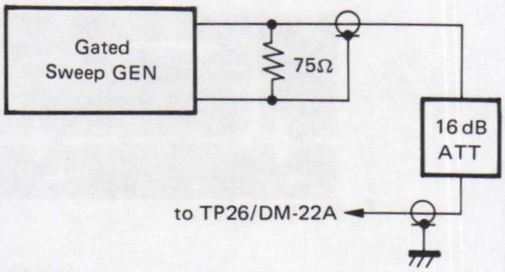
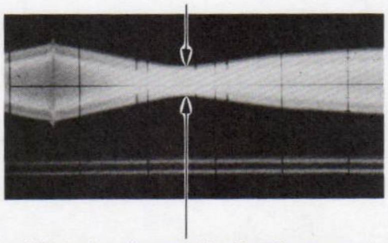
11-2-2. Color Mode Y Output Level Adjustment

machine conditions for adjustment	spec.	adjustment
• Playing back the color bar segment of Alignment Tape. • Set the TRACKING control to its center detent.	TP2/DM-22A 	⊘ RV7/DM-22A TRIG; TP1/SV-31A

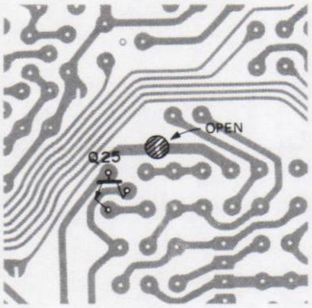
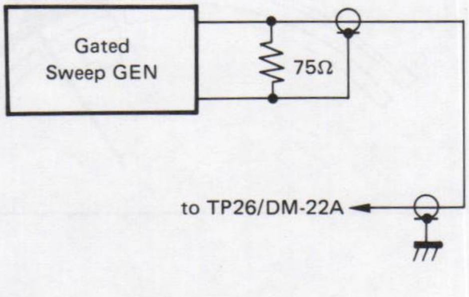
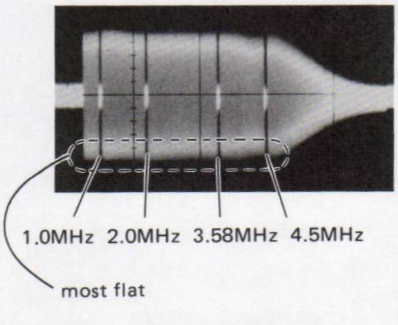
11-2-3. Video Output Level Adjustment

machine conditions for adjustment	spec.	adjustment
• Playing back the color bar segment of Alignment Tape. • Set the TRACKING control to its center detent.	TP10/DM-22A 	⊘ RV21/DM-22A TRIG; TP8/DM-22A

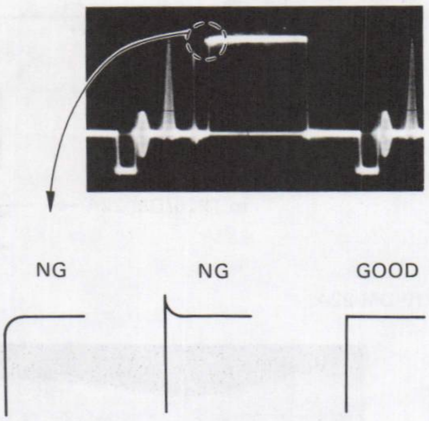
11-2-4. Noise Canceller Adjustment

machine conditions for adjustment	spec.	adjustment
• STOP (E-E) mode. • Set the NOISE CANCEL sw on DM-22A board to SHARP. • Unsolder the following position on the DM-22A board.  	 Gated Sweep GEN 75Ω 16 dB ATT to TP26/DM-22A TP10/DM-22A  Minimize the amplitude of cross point (cross point ; 3.2MHz ± 0.4MHz)	⊘ RV17/DM-22A TRIG; INT

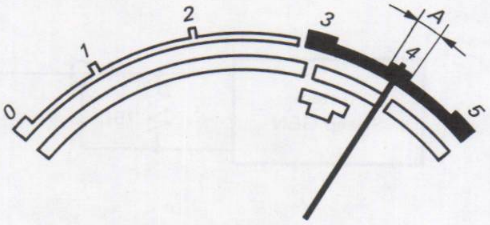
11-2-5. Drop-Out Compensator Frequency Response Adjustment

machine conditions for adjustment	spec.	adjustment
• STOP (E-E) mode. • Unsolder the following position on the DM-22A board.  • VIDEO IN; no signal input.	 Gated Sweep GEN 75Ω to TP26/DM-22A TP41/DM-22A  	1.0 MHz Adj. ⊘ LV37/DM-22A adjacent to 1.0 MHz ⊘ RV19/DM-22A 4.0 MHz Adj. ⊘ LV42/DM-22A NOTE: RV19 DELETED S/N 14631 ~ (AEP) S/N 11021 ~ (UK) TRIG; INT

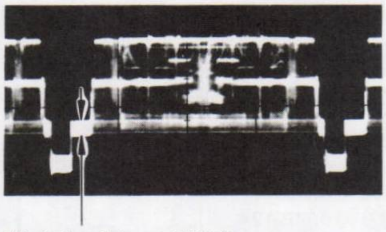
11-2-6. Color-Y Phase Equalizing Adjustment

machine conditions for adjustment	spec.	adjustment
• Playing back the Sin² waveform segment of Alignment Tape. • MONITOR TV sw; B/W	TP10/DM-22A 	⊘ RV401/DM-22A TRIG; TP8/DM-22A

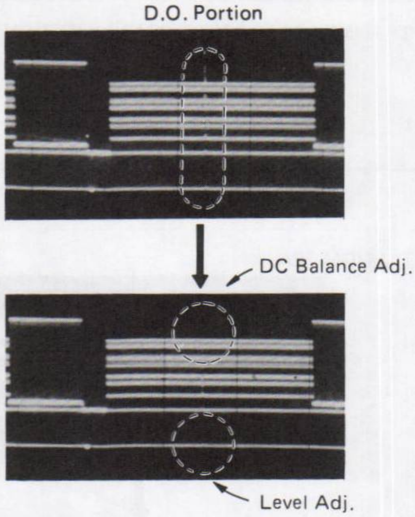
11-2-7. TRACKING Meter Calibration Adjustment

machine conditions for adjustment	spec.	adjustment
• VIDEO IN; color bar signal. • VIDEO LEVEL sw; AUTO • 75Ω sw; ON • Self-Record and then Playback mode.	TRACKING meter 	⊘ Adjust RV701/MP-12A board that point in "A" region of scale.

11-2-8. Carrier Balance Adjustment

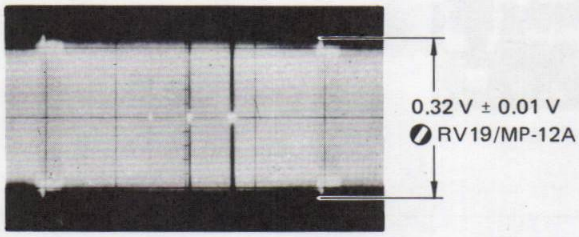
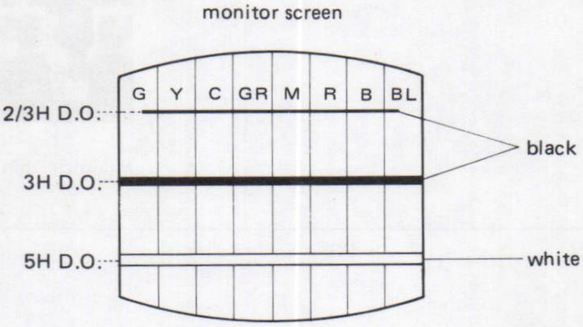
machine conditions for adjustment	spec.	adjustment
• VIDEO IN; B/W video signal. • VIDEO LEVEL sw; AUTO • 75Ω sw; ON • STOP (E-E) mode.	TP2/DM-22A  Minimize this amplitude (carrier leak)	⊘RV601/MP-12A TRIG; TP8/DM-22A

11-2-9. D.O.C. DC Balance and Level Adjustment

machine conditions for adjustment	spec.	adjustment
• Playing back the Drop-Out segment of Alignment Tape. • MONITOR TV sw; B/W	AT SCOPE TP10/DM-22A  AT MONITOR Adjust the variable resistor RV22 and RV61/DM-22A board repeatedly so that the Drop-Out portion can not be found on the monitor screen, white noise and black noise does not appear at the Drop-Out portion and the H sync does not distort at the Drop-Out portion.	DC Balance Adj. ⊘RV61/DM-22A Level Adj. ⊘RV22/DM-22A TRIG; TP1/SV-31A

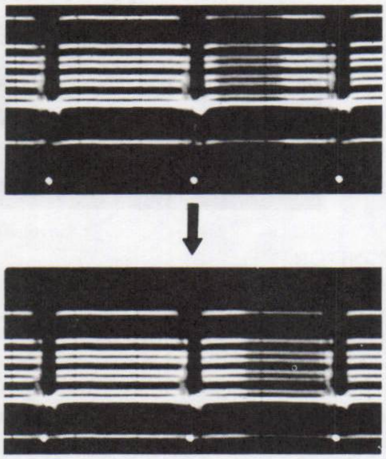
NOTE: Don't use the Alignment tape RR5-1S.

11-2-10. Drop-Out Compensator Sensitivity Level Adjustment

machine conditions for adjustment	**spec. and adjustment**
- Playing back the Pseudo Color-bar segment of Alignment Tape. - Monitor TV sw; color TP31/MP-12A 	AT MONITOR  monitor screen G Y C GR M R B BL 2/3H D.O. 3H D.O. 5H D.O. black white Adjust RV22/MP-12A board so that the white noise does not just appear at the right side of the 3H Drop-out portion on the monitor screen.

* After this adjustment, Reset the Level of TP31/MP-12A (0.3 V ± 0.02 V) by RV19/MP-12A.

11-2-11. DUB Y Still VD Adjustment

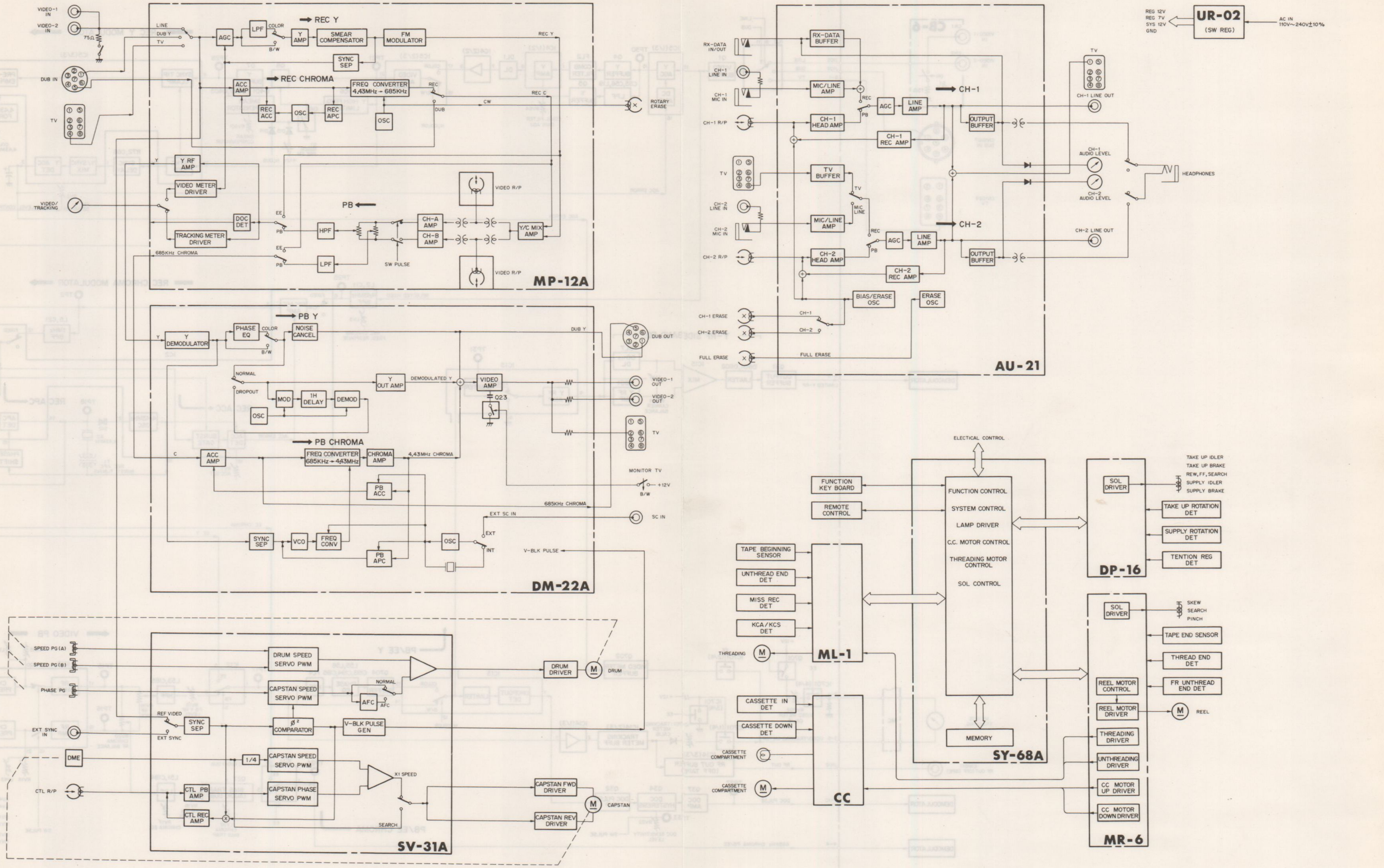
machine conditions for adjustment	**spec.**	**adjustment**
- Playing back the color bar segment of Alignment Tape. - PAUSE mode.	TP11/DM-22A 	RV8/DM-22A TRIG; TP1/SV-31A

CIRCUIT FUNCTION OF THE PRINTED CIRCUIT BOARD

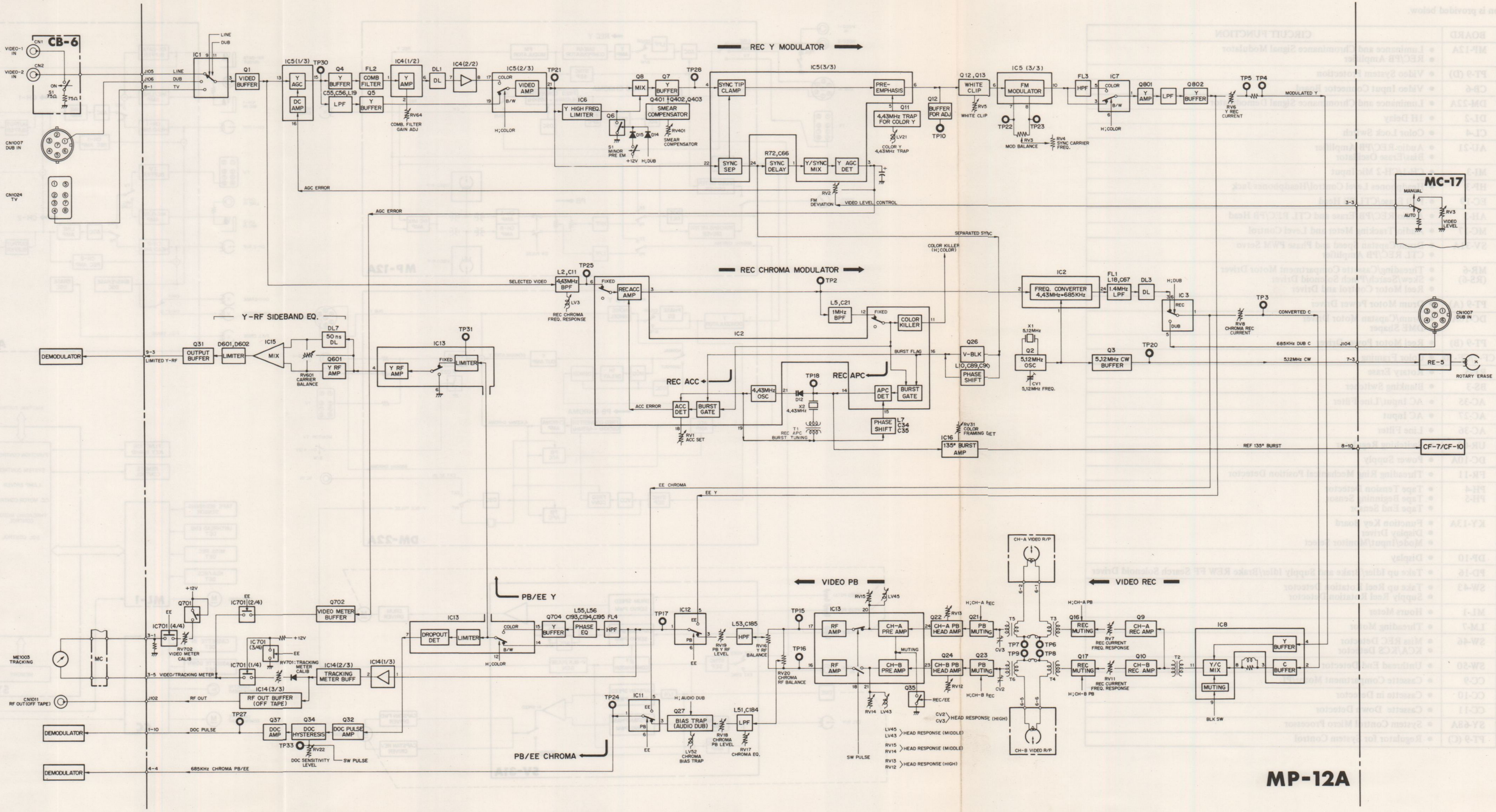
The circuit board information is provided below.

SYSTEM	BOARD	CIRCUIT FUNCTION
VIDEO	MP-12A	• Luminance and Chrominance Signal Modulator • REC/PB Amplifier
	PT-9 (D)	• Video System Protection
	CB-6	• Video Input Connector Board
	DM-22A	• Luminance and Chrominance Signal Demodulator
	DL-2	• 1H Delay
	CL-4	• Color Lock Switch
AUDIO	AU-21	• Audio REC/PB Amplifier • Bias/Erase Oscillator
	MI-3	• CH-1/CH-2 Mic Input
	HP-3	• Headphones Level Control/Headphones Jack
	EC-19	• Full Erase/CTL PB Head
	AH-3	• Audio REC/PB/Erase and CTL REC/PB Head
	MC-17	• Audio/Tracking Meter and Level Control
SERVO	SV-31A	• Drum/Capstan Speed and Phase PWM Servo • CTL REC/PB Amplifier
	MR-6 (RS-6)	• Threading/Cassette Compartment Motor Driver • Skew/Search/Pinch Solenoid Driver • Reel Motor Control and Driver
	PT-9 (A)	• Drum Motor Power Driver
	DC-10A	• Drum/Capstan Motor Driver • DME Shaper
	PT-9 (B)	• Reel Motor Power Driver
	CF-7/CF-10	• Color Framing
EDIT	RE-5	• Rotary Erase
	BS-3	• Blanking Switcher
POWER SUPPLY	AC-35	• AC Input/Line Filter
	AC-27	• AC Input
	AC-36	• Line Filter
	UR-02	• Switching Regulator
	DC-10A	• Power Supply
SYSTEM CONTROL	FR-11	• Threading Ring Mechanical Position Detector
	PH-4 PH-5	• Tape Tension Detector • Tape Beginning Sensor • Tape End Sensor
	KY-13A	• Function Key Board • Display Driver • Mode/Input/Monitor Select
	DP-10	• Display
	PD-16	• Take up Idler/Brake and Supply Idler/Brake REW FF Search Solenoid Driver
	SW-43	• Take up Reel Rotation Detector • Supply Reel Rotation Detector
	ML-1	• Hours Meter
	LM-7	• Threading Motor
	SW-46	• Miss REC Detector • KCA/KCS Detector
	SW-50	• Unthread End Detector
	CC-9	• Cassette Compartment Motor/PL
	CC-10	• Cassette in Detector
	CC-11	• Cassette Down Detector
	SY-68A	• System Control Micro Processor
	PT-9 (C)	• Regulator for System Control

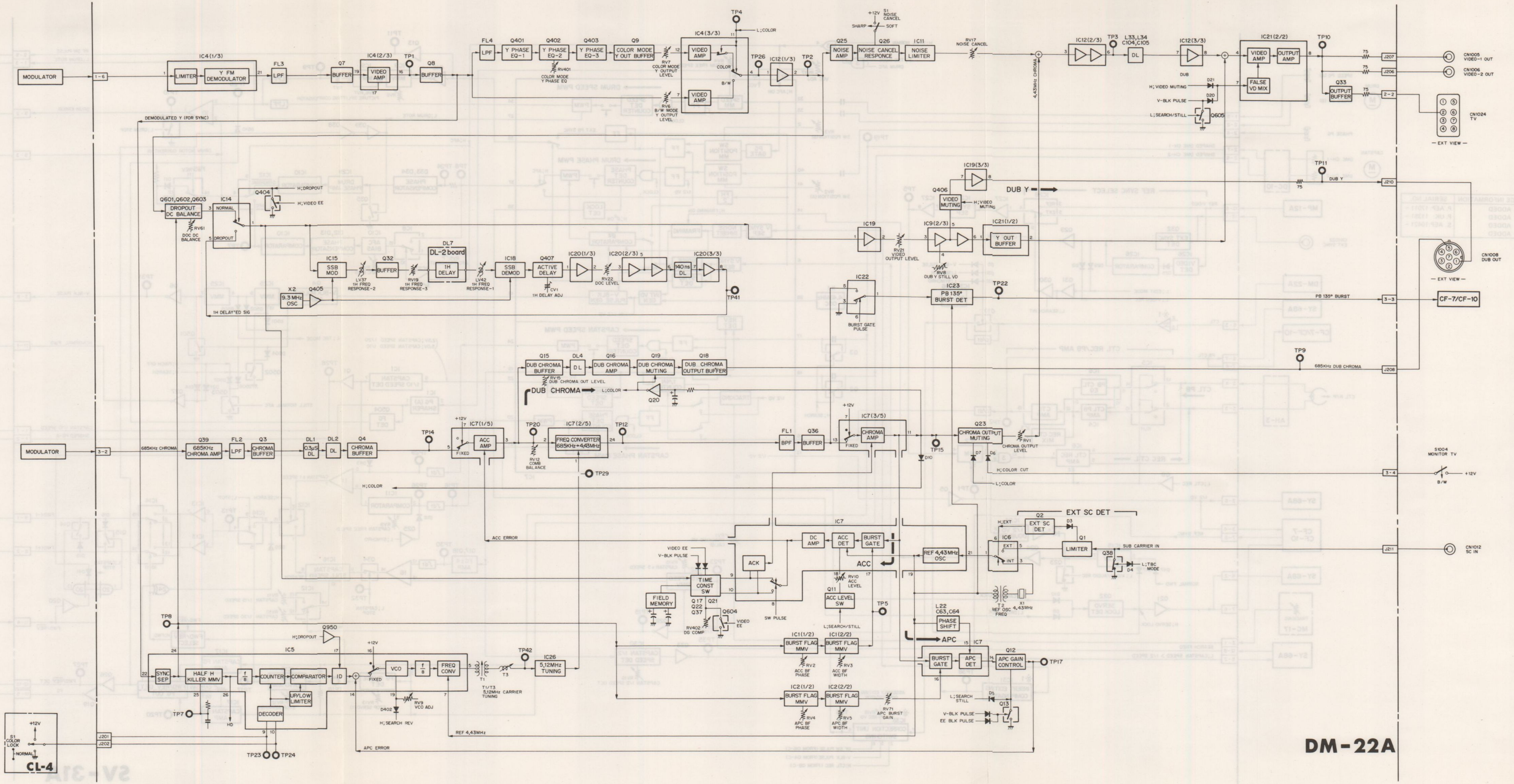
OVERALL BLOCK DIAGRAM


MP-12A
REC Y
REC CHROMA
PB
AGC
LPF
Y AMP
SMEAR COMPENSATOR
FM MODULATOR
SYNC SEP
ACC AMP
FREQ CONVERTER 4.43MHz → 685KHz
REC ACC
OSC
REC APC
Y RF AMP
VIDEO METER DRIVER
TRACKING METER DRIVER
DOC DET
HPF
CH-A AMP
CH-B AMP
Y/C MIX AMP
VIDEO R/P
ROTARY ERASE
VIDEO-1 IN
VIDEO-2 IN
DUB IN
TV
VIDEO/TRACKING
DM-22A
PB Y
Y DEMODULATOR
PHASE EQ
NOISE CANCEL
MOD
1H DELAY
DEMOD
Y OUT AMP
VIDEO AMP
PB CHROMA
FREQ CONVERTER 685KHz → 4.43MHz
CHROMA AMP
PB ACC
SYNC SEP
VCO
FREQ CONV
PB APC
OSC
DUB OUT
VIDEO-1 OUT
VIDEO-2 OUT
MONITOR TV
SC IN
V-BLK PULSE
SV-31A
DRUM SPEED SERVO PWM
CAPSTAN SPEED SERVO PWM
AFC
SYNC SEP
COMPARATOR
V-BLK PULSE GEN
1/4
CAPSTAN SPEED SERVO PWM
CAPSTAN PHASE SERVO PWM
CTL PB AMP
CTL REC AMP
DRUM DRIVER
DRUM
CAPSTAN FWD DRIVER
CAPSTAN REV DRIVER
CAPSTAN
SPEED PG (A)
SPEED PG (B)
PHASE PG
EXT SYNC IN
DME
CTL R/P
X1 SPEED
SEARCH
AU-21
RX-DATA BUFFER
MIC/LINE AMP
CH-1 HEAD AMP
CH-1 REC AMP
TV BUFFER
CH-2 HEAD AMP
CH-2 REC AMP
AGC
LINE AMP
OUTPUT BUFFER
CH-1
CH-2
BIAS/ERASE OSC
ERASE OSC
CH-1 LINE OUT
CH-2 LINE OUT
CH-1 AUDIO LEVEL
CH-2 AUDIO LEVEL
HEADPHONES
CH-1 ERASE
CH-2 ERASE
FULL ERASE
UR-02
(SW REG)
REG 12V
REG TV
SYS 12V
GND
AC IN 110V~240V±10%
SY-68A
ELECTICAL CONTROL
FUNCTION CONTROL
SYSTEM CONTROL
LAMP DRIVER
C.C. MOTOR CONTROL
THREADING MOTOR CONTROL
SOL CONTROL
MEMORY
FUNCTION KEY BOARD
REMOTE CONTROL
ML-1
TAPE BEGINNING SENSOR
UNTHREAD END DET
MISS REC DET
KCA/KCS DET
THREADING
CC
CASSETTE IN DET
CASSETTE DOWN DET
CASSETTE COMPARTMENT
DP-16
SOL DRIVER
TAKE UP ROTATION DET
SUPPLY ROTATION DET
TENTION REG DET
TAKE UP IDLER
TAKE UP BRAKE
REW, FF, SEARCH
SUPPLY IDLER
SUPPLY BRAKE
MR-6
SKEW
SEARCH
PINCH
TAPE END SENSOR
THREAD END DET
FR UNTHREAD END DET
REEL MOTOR CONTROL
REEL MOTOR DRIVER
REEL
THREADING DRIVER
UNTHREADING DRIVER
CC MOTOR UP DRIVER
CC MOTOR DOWN DRIVER

VIDEO MODULATOR BLOCK DIAGRAM


CB-6
CN1 VIDEO-1 IN
CN2 VIDEO-2 IN
ON S1 75Ω 75Ω
CN1007 DUB IN
CN1024 TV
J105 LINE
J106 DUB
8-1 TV
IC1 LINE DUB
Q1 VIDEO BUFFER
IC5(1/3) Y AGC DC AMP
TP30
Q4 Y BUFFER
C55,C56,L19 LPF
FL2 COMB FILTER
Q5 Y BUFFER
IC4(1/2) Y AMP
RV64 COMB. FILTER GAIN ADJ
DL1 DL
IC4(2/2)
IC5(2/3) COLOR B/W VIDEO AMP
H;COLOR
TP21
IC6 Y HIGH FREQ. LIMITER
Q6
S1 MINOR PRE EM
D15 D14
+12V H;DUB
Q8 MIX
Q7 Y BUFFER
Q401 Q402,Q403 SMEAR COMPENSATOR
RV401 SMEAR COMPENSATOR
TP28
REC Y MODULATOR
IC5(3/3)
SYNC TIP CLAMP
SYNC SEP
R72,C66 SYNC DELAY
Y/SYNC MIX
Y AGC DET
PRE-EMPHASIS
Q11 4.43MHz TRAP FOR COLOR Y
LV21 COLOR Y 4.43MHz TRAP
RV2 FM DEVIATION
VIDEO LEVEL CONTROL
Q12 BUFFER FOR ADJ
TP10
Q12,Q13 WHITE CLIP
RV5 WHITE CLIP
IC5 (3/3) FM MODULATOR
TP22 TP23
RV3 MOD BALANCE
RV4 SYNC CARRIER FREQ.
FL3 HPF
IC7 COLOR B/W
H;COLOR
Q801 Y AMP
LPF
Q802 Y BUFFER
RV6 Y REC CURRENT
TP5 TP4
MODULATED Y
MC-17
MANUAL AUTO
RV3 VIDEO LEVEL
3-3
AGC ERROR
AGC ERROR
SEPARATED SYNC
COLOR KILLER (H;COLOR)
SELECTED VIDEO
TP25
L2,C11 4.43MHz BPF
LV3 REC CHROMA FREQ. RESPONSE
REC CHROMA MODULATOR
FIXED
REC ACC AMP
IC2
TP2
L5,C21 1MHz BPF
FIXED
COLOR KILLER
BURST FLAG
REC ACC
REC APC
ACC ERROR
ACC DET
BURST GATE
RV1 ACC SET
4.43MHz OSC
TP18
D12
X2 4.43MHz
T1 REC APC BURST TUNING
APC DET
BURST GATE
PHASE SHIFT L7 C34 C35
Q26 V-BLK
L10,C89,C90 PHASE SHIFT
RV31 COLOR FRAMING DET
IC16 135° BURST AMP
IC2 FREQ. CONVERTER 4.43MHz→685KHz
X1 5.12MHz
Q2 5.12MHz OSC
CV1 5.12MHz FREQ.
FL1 L18,C67 1.4MHz LPF
DL3 DL
H;DUB
IC3 REC DUB
RV8 CHROMA REC CURRENT
TP3
CONVERTED C
Q3 5.12MHz CW BUFFER
TP20
685KHz DUB C
J104
CN1007 DUB IN
5.12MHz CW
7-3
RE-5
ROTARY ERASE
REF 135° BURST
8-10
CF-7/CF-10
Y-RF SIDEBAND EQ.
DEMODULATOR
9-3 LIMITED Y-RF
Q31 OUTPUT BUFFER
D601,D602 LIMITER
IC15 MIX
RV601 CARRIER BALANCE
DL7 50 ns DL
Q601 Y RF AMP
IC13 Y RF AMP
FIXED
LIMITER
TP31
EE CHROMA
EE Y
PB/EE Y
ME1003 TRACKING
MC
3-1
3-5 VIDEO/TRACKING METER
CN1011 RF OUT(OFF TAPE)
J102 RF OUT
1-10 DOC PULSE
4-4 685KHz CHROMA PB/EE
DEMODULATOR
DEMODULATOR
+12V
Q701
EE
IC701 (4/4)
RV702 VIDEO METER CALIB
IC701 (2/4)
Q702 VIDEO METER BUFFER
IC701 (3/4)
+12V EE
IC701 (1/4)
RV701: TRACKING METER CALIB
IC14(2/3) TRACKING METER BUFF
IC14(1/3)
IC14(3/3) RF OUT BUFFER (OFF TAPE)
TP27
Q37 DOC AMP
Q34 DOC HYSTERESIS
Q32 DOC PULSE AMP
TP33
RV22 DOC SENSITIVITY LEVEL
SW PULSE
IC13 DROPOUT DET LIMITER
COLOR B/W
H;COLOR
Q704 Y BUFFER
L55,L56 C193,C194,C195 PHASE EQ
FL4 HPF
TP17
IC12 EE PB
RV19 PB Y RF LEVEL
L53,C185 HPF
RV16 Y RF BALANCE
RV20 CHROMA RF BALANCE
TP15 TP16
PB/EE CHROMA
TP24
IC11 EE PB
H; AUDIO DUB
Q27 BIAS TRAP (AUDIO DUB)
LV52 CHROMA BIAS TRAP
RV18 CHROMA PB LEVEL
L51,C184 LPF
RV17 CHROMA EQ.
VIDEO PB
IC13
RF AMP
RF AMP
CH-A PRE AMP
CH-B PRE AMP
MUTING
RV15 LV45
RV14 LV43
SW PULSE
Q35 REC/EE
Q22 CH-A PB HEAD AMP
RV13
Q24 CH-B PB HEAD AMP
RV12
H;CH-A REC
Q21 PB MUTING
Q23 PB MUTING
H;CH-B REC
CV3 CV2
T5 T6
TP7 TP9 TP6 TP8
CH-A VIDEO R/P
CH-B VIDEO R/P
6-2 6-1 6-5 6-6
T3 T4
CV2 CV3 HEAD RESPONSE (HIGH)
LV45 LV43 HEAD RESPONSE (MIDDLE)
RV15 RV14 HEAD RESPONSE (MIDDLE)
RV13 RV12 HEAD RESPONSE (HIGH)
VIDEO REC
H;CH-A PB
Q16 REC MUTING
Q17 REC MUTING
H;CH-B PB
RV7 REC CURRENT FREQ. RESPONSE
RV11 REC CURRENT FREQ. RESPONSE
Q9 CH-A REC AMP
Q10 CH-B REC AMP
T2
IC8 Y/C MIX MUTING Y BUFFER C BUFFER
BLK SW
MP-12A

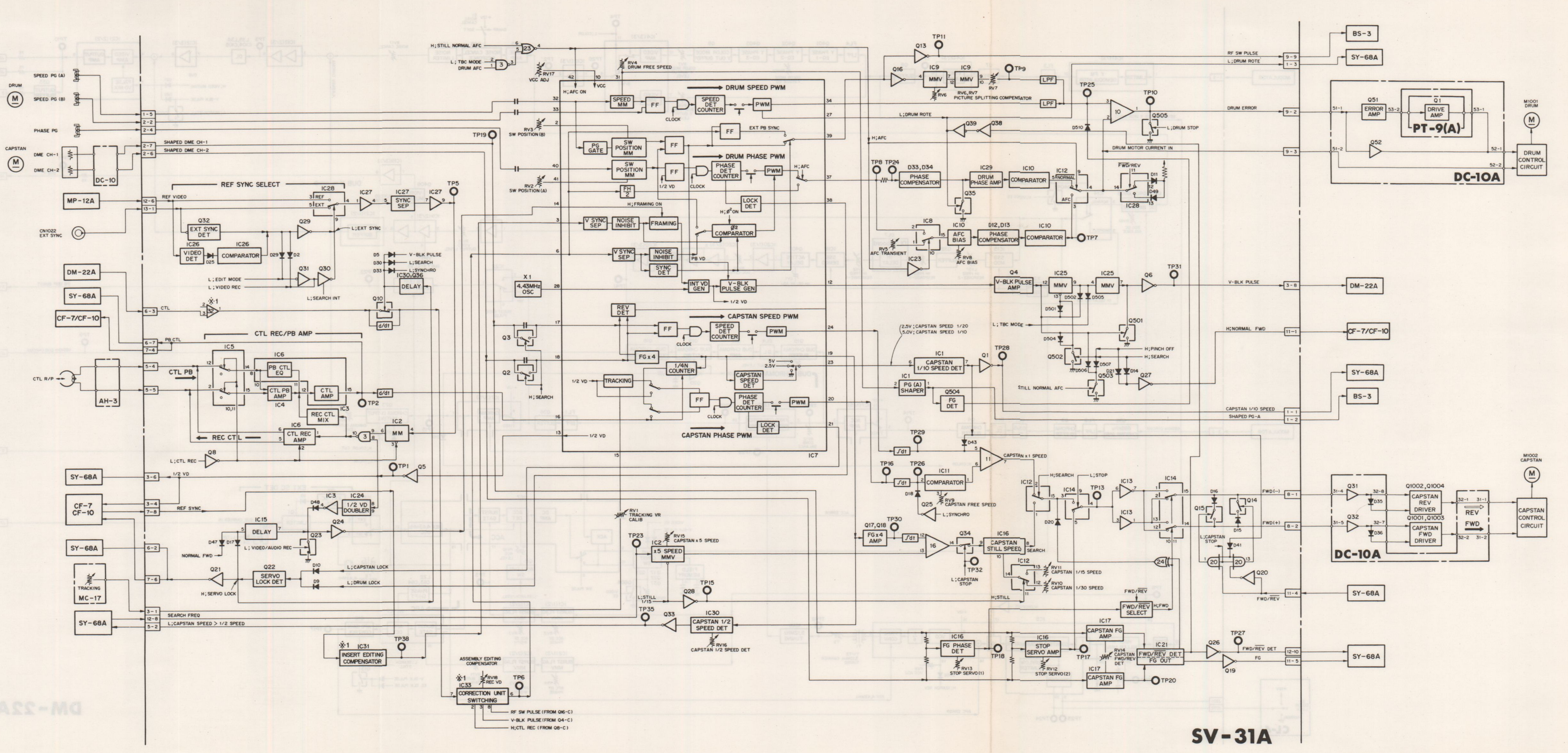
VIDEO DEMODULATOR BLOCK DIAGRAM


MODULATOR
1-6
IC4(1/3)
LIMITER
Y FM DEMODULATOR
FL3
LPF
Q7
BUFFER
IC4(2/3)
VIDEO AMP
TP1
Q8
BUFFER
DEMODULATED Y (FOR SYNC)
FL4
LPF
Q401
Y PHASE EQ-1
Q402
Y PHASE EQ-2
RV401
COLOR MODE Y PHASE EQ
Q403
Y PHASE EQ-3
Q9
COLOR MODE Y OUT BUFFER
RV7
COLOR MODE Y OUTPUT LEVEL
RV6
B/W MODE Y OUTPUT LEVEL
IC4(3/3)
VIDEO AMP
VIDEO AMP
TP4
L;COLOR
COLOR
B/W
TP26
IC12(1/3)
TP2
+12V
S1
NOISE CANCEL
SHARP
SOFT
Q25
NOISE AMP
Q26
NOISE CANCEL RESPONCE
IC11
NOISE LIMITER
RV17
NOISE CANCEL
4,43MHz CHROMA
IC12(2/3)
TP3
L33,L34
C104,C105
DL
IC12(3/3)
DUB
H; VIDEO MUTING
D21
V-BLK PULSE
D20
L; SEARCH/STILL
Q605
IC21(2/2)
VIDEO AMP
OUTPUT AMP
FALSE VD MIX
TP10
75
J207
CN1005
VIDEO-1 OUT
75
J206
CN1006
VIDEO-2 OUT
Q33
OUTPUT BUFFER
75
2-2
CN1024
TV
— EXT VIEW —
Q601,Q602,Q603
DROPOUT DC BALANCE
RV61
DOC DC BALANCE
IC14
NORMAL
DROPOUT
Q404
H; DROPOUT
H; VIDEO EE
DL7
DL-2 board
1H DELAY
IC15
SSB MOD
LV37
1H FREQ RESPONSE-2
Q32
BUFFER
RV19
1H FREQ RESPONSE-3
LV42
1H FREQ RESPONSE-1
IC18
SSB DEMOD
Q407
ACTIVE DELAY
CV1
1H DELAY ADJ
IC20(1/3)
RV22
DOC LEVEL
IC20(2/3)
140ns DL
IC20(3/3)
TP41
X2
9.3MHz OSC
Q405
1H DELAY'ED SIG
IC19(3/3)
Q406
VIDEO MUTING
H; VIDEO MUTING
DUB Y
TP11
75
DUB Y
J210
IC19
RV21
VIDEO OUTPUT LEVEL
IC9(2/3)
RV8
DUB Y STILL VD
IC21(1/2)
Y OUT BUFFER
CN1008
DUB OUT
— EXT VIEW —
IC22
BURST GATE PULSE
IC23
PB 135° BURST DET
TP22
PB 135° BURST
3-3
CF-7/CF-10
Q15
DUB CHROMA BUFFER
RV15
DUB CHROMA OUT LEVEL
DL4
DL
Q16
DUB CHROMA AMP
Q19
DUB CHROMA MUTING
Q18
DUB CHROMA OUTPUT BUFFER
DUB CHROMA
L; COLOR
Q20
TP9
685KHz DUB CHROMA
J208
MODULATOR
3-2
685KHz CHROMA
Q39
685KHz CHROMA AMP
FL2
LPF
Q3
CHROMA BUFFER
DL1
0.3μS DL
DL2
DL
Q4
CHROMA BUFFER
TP14
+12V
IC7(1/5)
ACC AMP
FIXED
TP20
RV12
COMB BALANCE
IC7(2/5)
FREQ CONVERTER 685KHz→4.43MHz
TP12
TP29
H; COLOR
FL1
BPF
Q36
BUFFER
+12V
IC7(3/5)
CHROMA AMP
FIXED
TP15
D10
Q23
CHROMA OUTPUT MUTING
RV1
CHROMA OUTPUT LEVEL
D7
D6
H; COLOR CUT
L; COLOR
S1004
MONITOR TV
3-4
+12V
B/W
ACC ERROR
IC7
DC AMP
ACC DET
BURST GATE
ACC
REF 4,43MHz OSC
EXT SC DET
Q2
EXT SC DET
D3
H; EXT
IC6
EXT
INT
Q1
LIMITER
SUB CARRIER IN
Q38
D4
L; TBC MODE
J211
CN1012
SC IN
VIDEO EE
V-BLK PULSE
TIME CONST SW
ACK
FIELD MEMORY
Q17 Q21
Q22
Q37
Q604
VIDEO EE
RV402
DG COMP
SW PULSE
RV10
ACC LEVEL
Q11
ACC LEVEL SW
L; SEARCH/STILL
TP5
T2
REF OSC FREQ
X1
4.43MHz
L22
C63,C64
PHASE SHIFT
APC
IC7
BURST GATE
APC DET
Q12
APC GAIN CONTROL
TP17
IC1(1/2)
BURST FLAG MMV
RV2
ACC BF PHASE
IC1(2/2)
BURST FLAG MMV
RV3
ACC BF WIDTH
IC2(1/2)
BURST FLAG MMV
RV4
APC BF PHASE
IC2(2/2)
BURST FLAG MMV
RV5
APC BF WIDTH
RV71
APC BURST GAIN
L; SEARCH STILL
D5
Q13
V-BLK PULSE
EE BLK PULSE
TP8
Q950
H; DROPOUT
IC5
SYNC SEP
HALF H KILLER MMV
f/8
COUNTER
COMPARATOR
UP/LOW LIMITER
DECODER
ID
HD
TP7
+12V
VCO
FIXED
f/8
FREQ CONV
D402
RV9
VCO ADJ
H; SEARCH REV
T1
T3
T1/T3
5,12MHz CARRIER TUNING
TP42
IC26
5,12MHz TUNING
REF 4,43MHz
APC ERROR
S1
COLOR LOCK
+12V
NORMAL
CL-4
J201
J202
TP23
TP24
DM-22A

SERVO SYSTEM BLOCK DIAGRAM

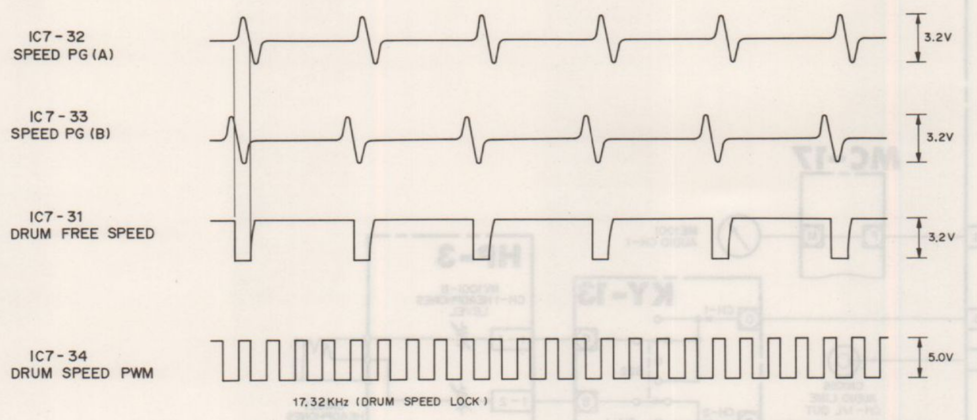
NOTE:

MARK	CHANGE INFORMATION	SERIAL NO.
※1	IC31 ADDED IC32 ADDED IC33 ADDED RV18 ADDED	P. AEP: 17011 ~ P. UK: 11351 ~ S. AEP: 10421 ~

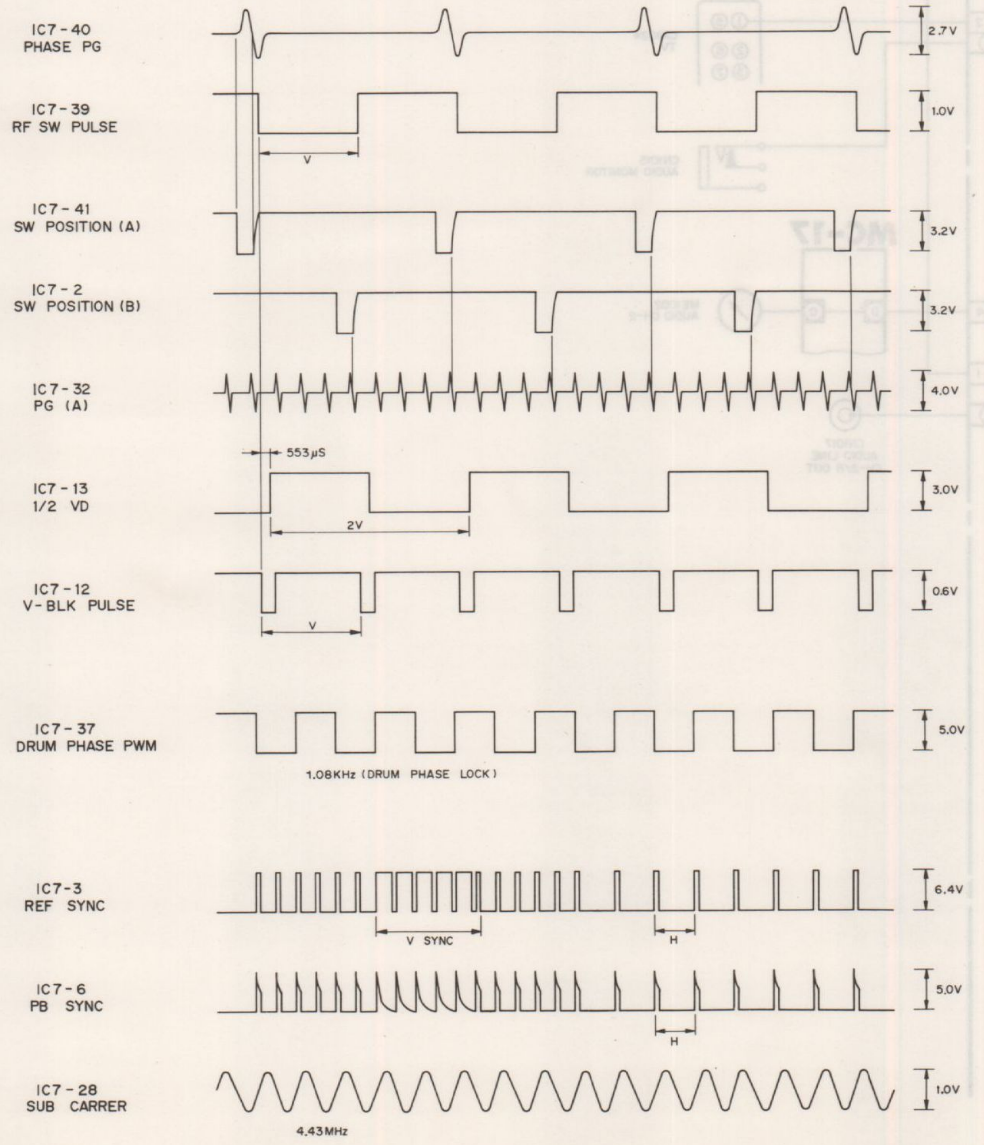

DRUM
SPEED PG (A)
SPEED PG (B)
PHASE PG
CAPSTAN
DME CH-1
DME CH-2
DC-10
MP-12A
CN1022 EXT SYNC
DM-22A
SY-68A
CF-7/CF-10
CTL R/P
AH-3
SY-68A
CF-7 CF-10
SY-68A
TRACKING MC-17
SY-68A
SHAPED DME CH-1
SHAPED DME CH-2
REF VIDEO
REF SYNC SELECT
IC28
IC27
IC27 SYNC SEP
IC27
TP5
Q32 EXT SYNC DET
IC26 VIDEO DET
IC26 COMPARATOR
Q29
L; EXT SYNC
Q31
Q30
L; EDIT MODE
L; VIDEO REC
L; SEARCH INT
V-BLK PULSE
L; SEARCH
L; SYNCHRO
IC30,Q36 DELAY
Q10
d/dt
CTL
PB CTL
CTL REC/PB AMP
IC5
IC6 PB CTL EQ
CTL PB AMP IC4
CTL AMP
CTL PB
d/dt
TP2
REC CTL MIX IC3
IC6 CTL REC AMP
REC CTL
IC2 MM
L; CTL REC
Q8
TP1
Q5
1/2 VD
REF SYNC
IC3
IC24 1/2 VD DOUBLER
IC15 DELAY
Q23
Q24
NORMAL FWD
L; VIDEO/AUDIO REC
Q21
Q22 SERVO LOCK DET
L; CAPSTAN LOCK
L; DRUM LOCK
H; SERVO LOCK
SEARCH FREQ
L; CAPSTAN SPEED > 1/2 SPEED
※1 IC31 INSERT EDITING COMPENSATOR
TP38
ASSEMBLY EDITING COMPENSATOR
※1 IC33 RV18 REC VD
CORRECTION UNIT SWITCHING
TP6
RF SW PULSE (FROM Q6-C)
V-BLK PULSE (FROM Q4-C)
H; CTL REC (FROM Q8-C)
H; STILL NORMAL AFC
L; TBC MODE
DRUM AFC
RV4 DRUM FREE SPEED
RV17 VCC ADJ
VCC
H; AFC ON
TP19
RV3 SW POSITION (B)
RV2 SW POSITION (A)
SPEED MM
FF
SPEED DET COUNTER
PWM
DRUM SPEED PWM
CLOCK
EXT PB SYNC
PG GATE
SW POSITION MM
SW POSITION MM
FH/2
DRUM PHASE PWM
PHASE DET COUNTER
LOCK DET
H; FRAMING ON
V SYNC SEP
NOISE INHIBIT
FRAMING
Ø2 COMPARATOR
V SYNC SEP
NOISE INHIBIT
SYNC DET
PB VD
INT VD GEN
V-BLK PULSE GEN
X1 4.43MHz OSC
1/2 VD
REV DET
CAPSTAN SPEED PWM
FF
SPEED DET COUNTER
PWM
FG x 4
Q3
Q2
H; SEARCH
1/2 VD
TRACKING
1/4N COUNTER
CAPSTAN SPEED DET
PHASE DET COUNTER
PWM
LOCK DET
CAPSTAN PHASE PWM
IC7
RV1 TRACKING VR CALIB
TP23
IC2 x5 SPEED MMV
RV15 CAPSTAN x5 SPEED
L; STILL 1/15
TP35
Q28
TP15
Q33
IC30 CAPSTAN 1/2 SPEED DET
RV16 CAPSTAN 1/2 SPEED DET
Q13
TP11
Q16
IC9 MMV
IC9 MMV
RV6
RV6,RV7 PICTURE SPLITTING COMPENSATOR
TP9
LPF
LPF
TP25
TP10
L; DRUM ROTE
Q39
Q38
H; AFC
D510
Q505
L; DRUM STOP
DRUM MOTOR CURRENT IN
TP8
TP24
D33,D34 PHASE COMPENSATOR
IC29 DRUM PHASE AMP
IC10 COMPARATOR
IC12 NORMAL AFC
Q35
FWD/REV
IC28
IC8
RV5 AFC TRANSIENT
IC23
IC10 AFC BIAS
RV8 AFC BIAS
D12,D13 PHASE COMPENSATOR
IC10 COMPARATOR
TP7
Q4 V-BLK PULSE AMP
IC25 MMV
IC25 MMV
Q6
TP31
L; TBC MODE
D501
D502
D505
D504
Q501
Q502
D506
D507
Q503
D21
D14
Q27
H; PINCH OFF
H; SEARCH
STILL NORMAL AFC
2.5V; CAPSTAN SPEED 1/20
5.0V; CAPSTAN SPEED 1/10
IC1 CAPSTAN 1/10 SPEED DET
Q1
TP28
IC1 PG (A) SHAPER
Q504 FG DET
TP29
∫dt
D43
CAPSTAN x1 SPEED
TP16
TP26
IC11 COMPARATOR
D18
Q25
RV9 CAPSTAN FREE SPEED
L; SYNCHRO
H; SEARCH
L; STOP
IC12
IC14
TP13
IC13
IC13
IC14
D20
D16
Q15
Q14
D15
L; CAPSTAN STOP
D41
Q20
Q17,Q18 FG x 4 AMP
TP30
∫dt
Q34
TP32
L; CAPSTAN STOP
IC16 CAPSTAN STILL SPEED
SEARCH
IC12
RV11 CAPSTAN 1/15 SPEED
RV10 CAPSTAN 1/30 SPEED
H; STILL
FWD/REV
FWD/REV SELECT
H; FWD
IC16 FG PHASE DET
TP18
RV13 STOP SERVO (1)
IC16 STOP SERVO AMP
RV12 STOP SERVO (2)
TP17
IC17 CAPSTAN FG AMP
RV14 CAPSTAN FWD/REV DET
IC17 CAPSTAN FG AMP
TP20
IC21 FWD/REV DET FG OUT
Q26
TP27
Q19
FWD/REV DET
FG
RF SW PULSE
L; DRUM ROTE
DRUM ERROR
V-BLK PULSE
H; NORMAL FWD
CAPSTAN 1/10 SPEED
SHAPED PG-A
FWD(-)
FWD(+)
FWD/REV
BS-3
SY-68A
DM-22A
CF-7/CF-10
SY-68A
BS-3
SY-68A
SY-68A
Q51 ERROR AMP
Q1 DRIVE AMP
PT-9(A)
Q52
M1001 DRUM
DRUM CONTROL CIRCUIT
DC-10A
Q31
Q32
Q1002,Q1004 CAPSTAN REV DRIVER
Q1001,Q1003 CAPSTAN FWD DRIVER
D35
D36
REV
FWD
M1002 CAPSTAN
CAPSTAN CONTROL CIRCUIT
DC-10A
SV-31A

SERVO SYSTEM TIMING CHART

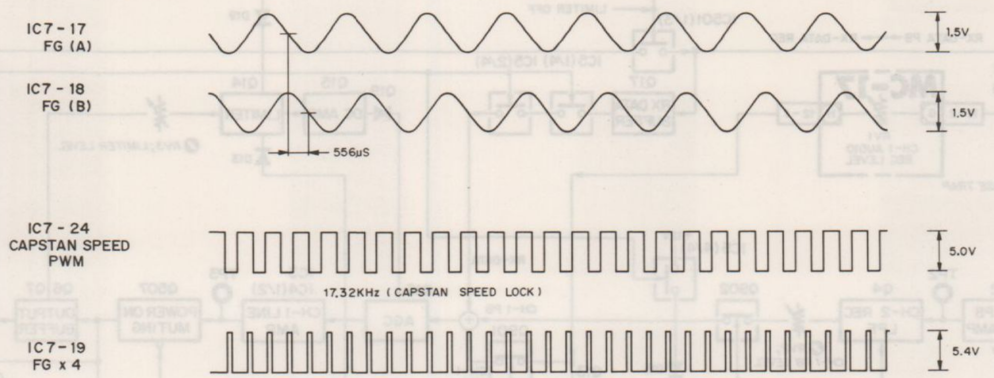
DRUM SPEED PWM SERVO


IC7-32
SPEED PG (A)
3.2V
IC7-33
SPEED PG (B)
3.2V
IC7-31
DRUM FREE SPEED
3.2V
IC7-34
DRUM SPEED PWM
5.0V
17.32KHz (DRUM SPEED LOCK)

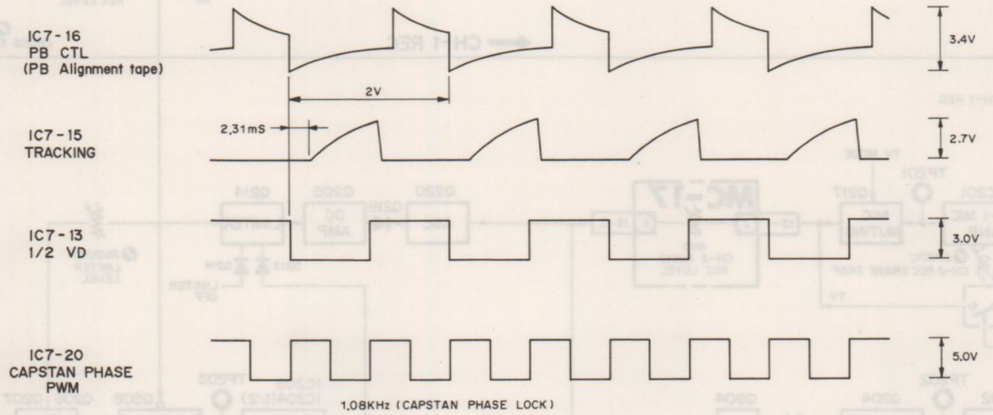
DRUM PHASE PWM SERVO


IC7-40
PHASE PG
2.7V
IC7-39
RF SW PULSE
1.0V
V
IC7-41
SW POSITION (A)
3.2V
IC7-2
SW POSITION (B)
3.2V
IC7-32
PG (A)
4.0V
553μS
IC7-13
1/2 VD
3.0V
2V
IC7-12
V-BLK PULSE
0.6V
V
IC7-37
DRUM PHASE PWM
5.0V
1.08KHz (DRUM PHASE LOCK)
IC7-3
REF SYNC
6.4V
V SYNC
H
IC7-6
PB SYNC
5.0V
H
IC7-28
SUB CARRER
1.0V
4.43MHz

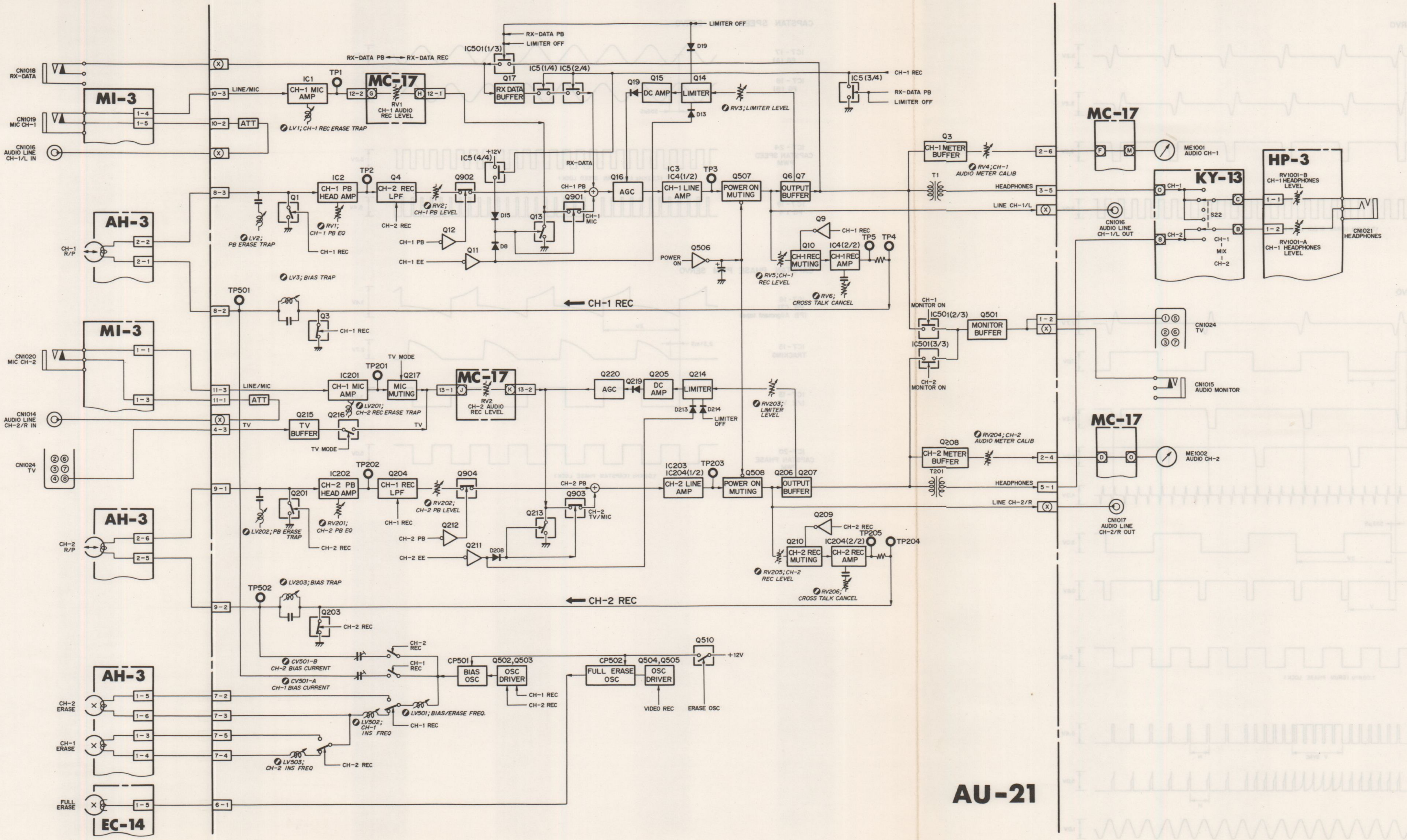
CAPSTAN SPEED PWM SERVO


IC7-17
FG (A)
1.5V
IC7-18
FG (B)
1.5V
556μS
IC7-24
CAPSTAN SPEED
PWM
5.0V
17.32KHz (CAPSTAN SPEED LOCK)
IC7-19
FG x 4
5.4V

CAPSTAN PHASE PWM SERVO

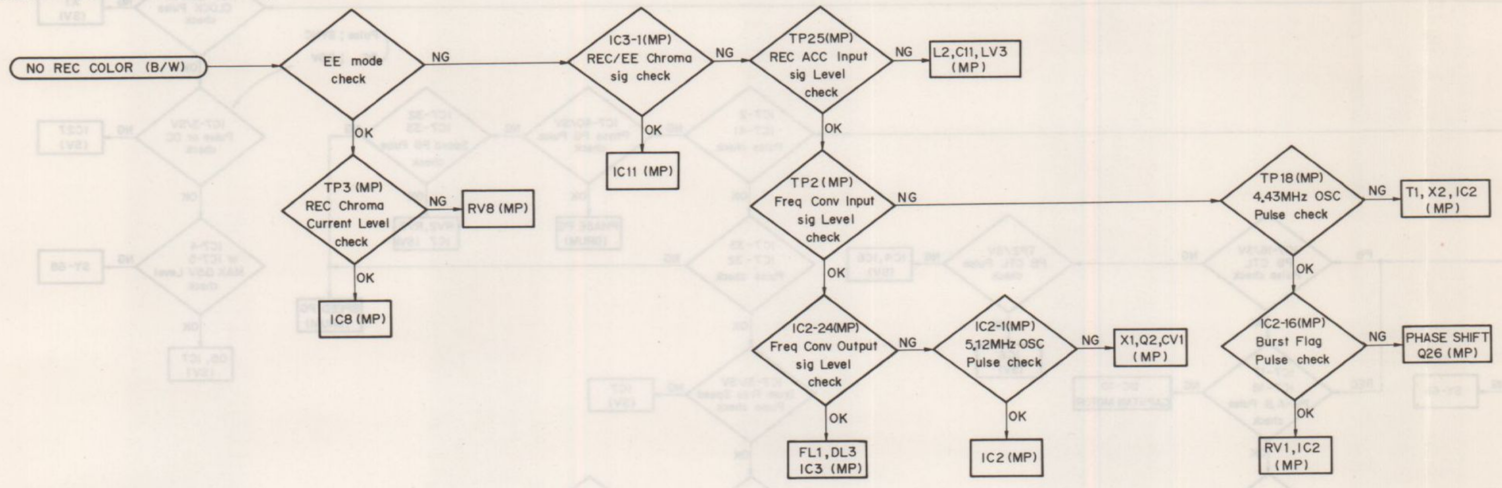

IC7-16
PB CTL
(PB Alignment tape)
3.4V
2V
IC7-15
TRACKING
2.31mS
2.7V
IC7-13
1/2 VD
3.0V
IC7-20
CAPSTAN PHASE
PWM
5.0V
1.08KHz (CAPSTAN PHASE LOCK)

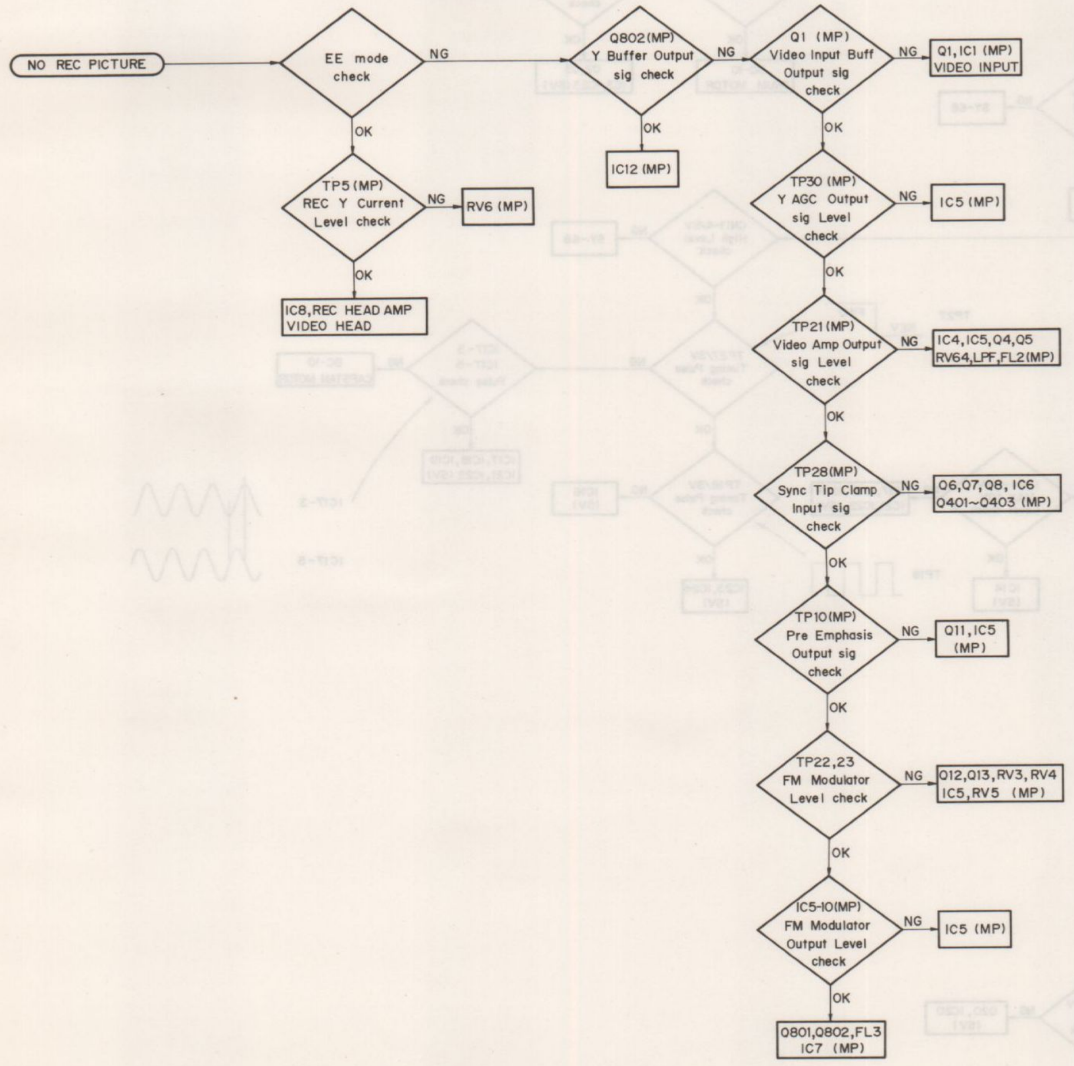
AUDIO SYSTEM BLOCK DIAGRAM

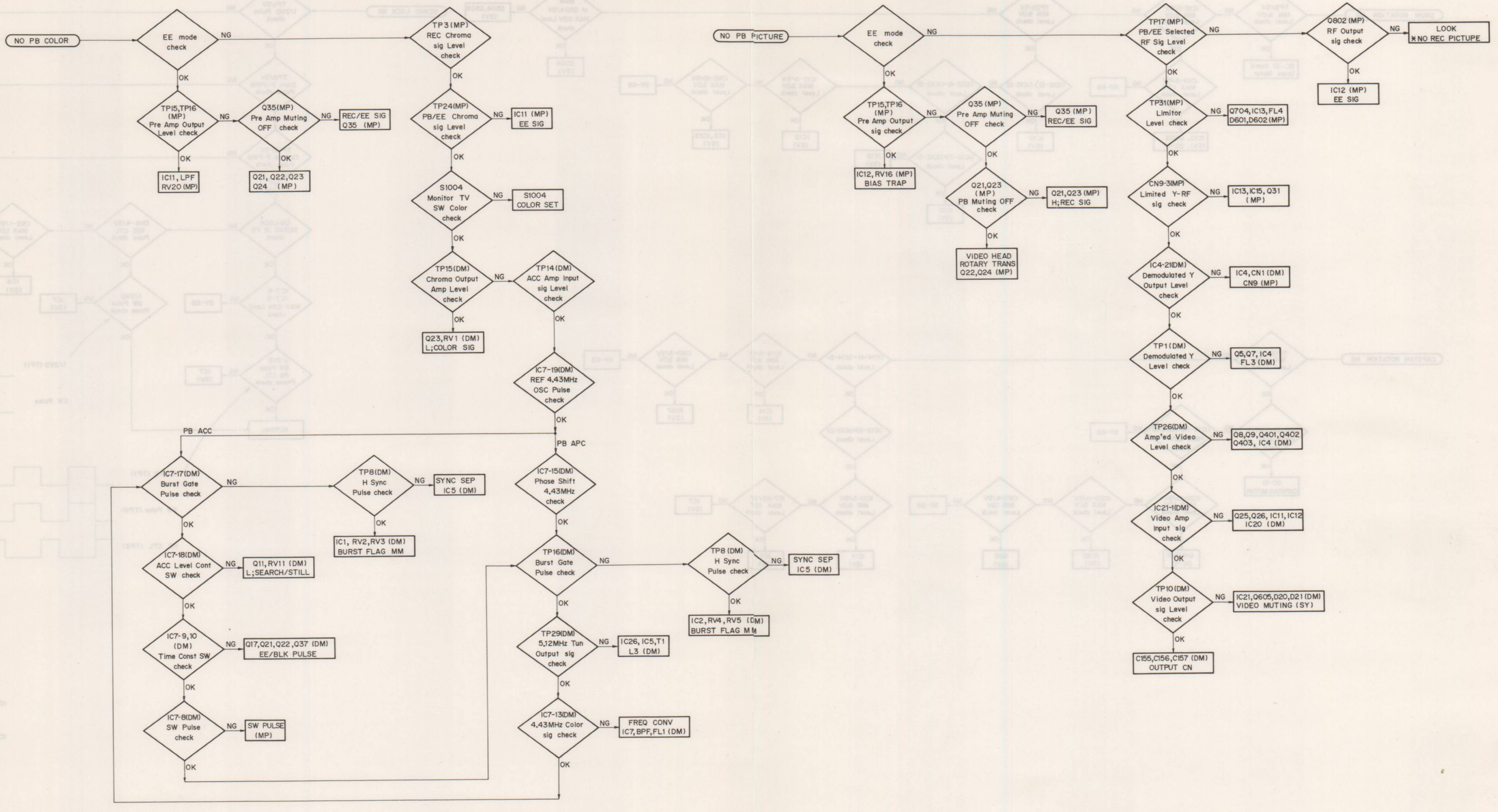

CN1018 RX-DATA
CN1019 MIC CH-1
CN1016 AUDIO LINE CH-1/L IN
MI-3
AH-3
CH-1 R/P
MI-3
CN1020 MIC CH-2
CN1014 AUDIO LINE CH-2/R IN
CN1024 TV
AH-3
CH-2 R/P
AH-3
CH-2 ERASE
CH-1 ERASE
FULL ERASE
EC-14
LINE/MIC
IC1 CH-1 MIC AMP
TP1
MC-17
RV1 CH-1 AUDIO REC LEVEL
ATT
LV1; CH-1 REC ERASE TRAP
RX-DATA PB
RX-DATA REC
IC501(1/3)
LIMITER OFF
Q17 RX DATA BUFFER
IC5(1/4) IC5(2/4)
Q19 Q15 DC AMP
Q14 LIMITER
D19 D13
RV3; LIMITER LEVEL
IC5(3/4)
CH-1 REC
IC5(4/4)
+12V
RX-DATA
IC2 CH-1 PB HEAD AMP
TP2
Q4 CH-2 REC LPF
Q902
Q1
RV1; CH-1 PB EQ
RV2; CH-1 PB LEVEL
LV2; PB ERASE TRAP
CH-2 REC
CH-1 REC
D15
D8
Q13
Q901 CH-1 MIC
CH-1 PB
Q12
Q11
CH-1 EE
Q16 AGC
IC3 IC4(1/2) CH-1 LINE AMP
TP3
Q507 POWER ON MUTING
Q6 Q7 OUTPUT BUFFER
Q506
POWER ON
Q9
Q10 CH-1 REC MUTING
IC4(2/2) CH-1 REC AMP
TP5 TP4
RV5; CH-1 REC LEVEL
RV6; CROSS TALK CANCEL
LV3; BIAS TRAP
TP501
Q3
CH-1 REC
TV MODE
TP201
IC201 CH-1 MIC AMP
Q217 MIC MUTING
MC-17
RV2 CH-2 AUDIO REC LEVEL
LV201; CH-2 REC ERASE TRAP
Q215 TV BUFFER
Q216
TV
Q220 AGC
Q219
Q205 DC AMP
Q214 LIMITER
D213 D214
LIMITER OFF
RV203; LIMITER LEVEL
IC202 CH-2 PB HEAD AMP
TP202
Q204 CH-1 REC LPF
Q904
Q201
RV201; CH-2 PB EQ
RV202; CH-2 PB LEVEL
LV202; PB ERASE TRAP
Q213
Q903 CH-2 TV/MIC
CH-2 PB
Q212
Q211
D208
CH-2 EE
IC203 IC204(1/2) CH-2 LINE AMP
TP203
Q508 POWER ON MUTING
Q206 Q207 OUTPUT BUFFER
Q209
Q210 CH-2 REC MUTING
IC204(2/2) CH-2 REC AMP
TP205
TP204
RV205; CH-2 REC LEVEL
RV206; CROSS TALK CANCEL
CH-1 REC
CH-2 REC
TP502
LV203; BIAS TRAP
Q203
CV501-B CH-2 BIAS CURRENT
CV501-A CH-1 BIAS CURRENT
CP501 BIAS OSC
Q502,Q503 OSC DRIVER
CP502 FULL ERASE OSC
Q504,Q505 OSC DRIVER
Q510
+12V
VIDEO REC
ERASE OSC
LV501; BIAS/ERASE FREQ.
LV502; CH-1 INS FREQ
LV503; CH-2 INS FREQ
Q3 CH-1 METER BUFFER
RV4; CH-1 AUDIO METER CALIB
T1
HEADPHONES
LINE CH-1/L
CH-1 MONITOR ON
IC501(2/3)
Q501 MONITOR BUFFER
IC501(3/3)
CH-2 MONITOR ON
Q208 CH-2 METER BUFFER
RV204; CH-2 AUDIO METER CALIB
T201
LINE CH-2/R
MC-17
ME1001 AUDIO CH-1
KY-13
S22
CH-1 MIX CH-2
HP-3
RV1001-B CH-1 HEADPHONES LEVEL
RV1001-A CH-1 HEADPHONES LEVEL
CN1021 HEADPHONES
CN1016 AUDIO LINE CH-1/L OUT
CN1024 TV
CN1015 AUDIO MONITOR
MC-17
ME1002 AUDIO CH-2
CN1017 AUDIO LINE CH-2/R OUT
AU-21

VIDEO SYSTEM FLOW CHART

CONDITION ; Clean the VIDEO Head, Locked Servo

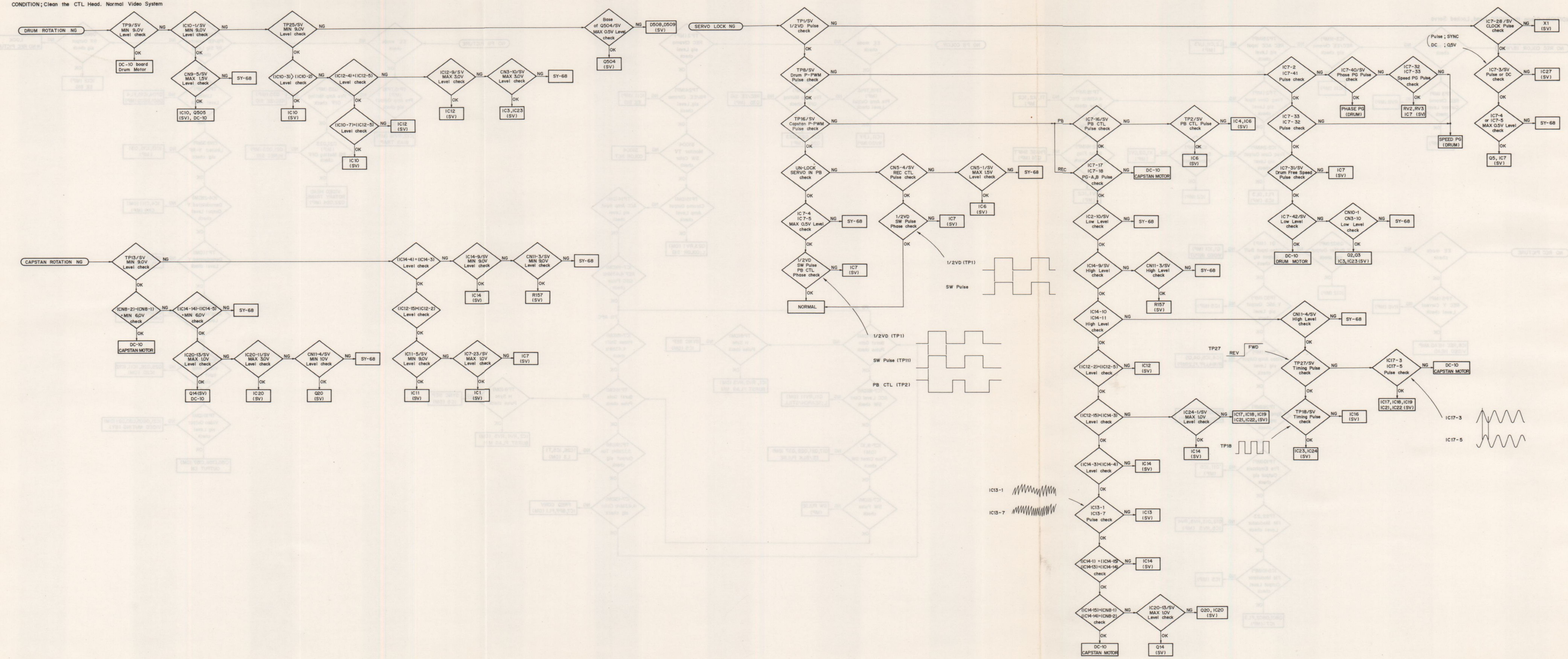

NO REC COLOR (B/W)
EE mode check
NG
OK
TP3 (MP) REC Chroma Current Level check
NG
RV8 (MP)
OK
IC8 (MP)
IC3-1(MP) REC/EE Chroma sig check
NG
OK
IC11 (MP)
TP25(MP) REC ACC Input sig Level check
NG
L2, C11, LV3 (MP)
OK
TP2 (MP) Freq Conv Input sig Level check
NG
OK
IC2-24(MP) Freq Conv Output sig Level check
NG
OK
FL1, DL3 IC3 (MP)
IC2-1(MP) 5,12MHz OSC Pulse check
NG
X1, Q2, CV1 (MP)
OK
IC2 (MP)
TP18 (MP) 4,43MHz OSC Pulse check
NG
T1, X2, IC2 (MP)
OK
IC2-16(MP) Burst Flag Pulse check
NG
PHASE SHIFT Q26 (MP)
OK
RV1, IC2 (MP)


NO REC PICTURE
EE mode check
NG
OK
TP5 (MP) REC Y Current Level check
NG
RV6 (MP)
OK
IC8, REC HEAD AMP VIDEO HEAD
Q802(MP) Y Buffer Output sig check
NG
OK
IC12 (MP)
Q1 (MP) Video Input Buff Output sig check
NG
Q1, IC1 (MP) VIDEO INPUT
OK
TP30 (MP) Y AGC Output sig Level check
NG
IC5 (MP)
OK
TP21 (MP) Video Amp Output sig Level check
NG
IC4, IC5, Q4, Q5 RV64, LPF, FL2 (MP)
OK
TP28(MP) Sync Tip Clamp Input sig check
NG
Q6, Q7, Q8, IC6 Q401~Q403 (MP)
OK
TP10(MP) Pre Emphasis Output sig check
NG
Q11, IC5 (MP)
OK
TP22,23 FM Modulator Level check
NG
Q12, Q13, RV3, RV4 IC5, RV5 (MP)
OK
IC5-10(MP) FM Modulator Output Level check
NG
IC5 (MP)
OK
Q801, Q802, FL3 IC7 (MP)


NO PB COLOR
EE mode check
NG
OK
TP15, TP16 (MP) Pre Amp Output Level check
NG
OK
IC11, LPF RV20 (MP)
Q35(MP) Pre Amp Muting OFF check
NG
REC/EE SIG Q35 (MP)
OK
Q21, Q22, Q23 Q24 (MP)
TP3 (MP) REC Chroma sig Level check
OK
TP24(MP) PB/EE Chroma sig Level check
NG
IC11 (MP) EE SIG
OK
S1004 Monitor TV SW Color check
NG
S1004 COLOR SET
OK
TP15(DM) Chroma Output Amp Level check
NG
OK
Q23, RV1 (DM) L;COLOR SIG
TP14 (DM) ACC Amp Input sig Level check
OK
IC7-19(DM) REF 4.43MHz OSC Pulse check
OK
PB ACC
PB APC
IC7-17(DM) Burst Gate Pulse check
NG
OK
TP8(DM) H Sync Pulse check
NG
SYNC SEP IC5 (DM)
OK
IC1, RV2, RV3 (DM) BURST FLAG MM
IC7-18(DM) ACC Level Cont SW check
NG
Q11, RV11 (DM) L;SEARCH/STILL
OK
IC7-9,10 (DM) Time Const SW check
NG
Q17, Q21, Q22, Q37 (DM) EE/BLK PULSE
OK
IC7-8(DM) SW Pulse check
NG
SW PULSE (MP)
OK
IC7-15(DM) Phase Shift 4.43MHz check
OK
TP16(DM) Burst Gate Pulse check
NG
TP8 (DM) H Sync Pulse check
NG
SYNC SEP IC5 (DM)
OK
IC2, RV4, RV5 (DM) BURST FLAG MM
OK
TP29(DM) 5.12MHz Tun Output sig check
NG
IC26, IC5, T1 L3 (DM)
OK
IC7-13(DM) 4.43MHz Color sig check
NG
FREQ CONV IC7, BPF, FL1 (DM)
OK
NO PB PICTURE
EE mode check
NG
OK
TP15, TP16 (MP) Pre Amp Output sig check
NG
OK
IC12, RV16 (MP) BIAS TRAP
Q35 (MP) Pre Amp Muting OFF check
NG
Q35 (MP) REC/EE SIG
OK
Q21, Q23 (MP) PB Muting OFF check
NG
Q21, Q23 (MP) H;REC SIG
OK
VIDEO HEAD ROTARY TRANS Q22, Q24 (MP)
TP17 (MP) PB/EE Selected RF Sig Level check
NG
Q802 (MP) RF Output sig check
NG
LOOK *NO REC PICTUPE
OK
IC12 (MP) EE SIG
OK
TP31(MP) Limitor Level check
NG
Q704, IC13, FL4 D601, D602 (MP)
OK
CN9-3(MP) Limited Y-RF sig check
NG
IC13, IC15, Q31 (MP)
OK
IC4-21(DM) Demodulated Y Output Level check
NG
IC4, CN1 (DM) CN9 (MP)
OK
TP1 (DM) Demodulated Y Level check
NG
Q5, Q7, IC4 FL3 (DM)
OK
TP26(DM) Amp'ed Video Level check
NG
Q8, Q9, Q401, Q402 Q403, IC4 (DM)
OK
IC21-1(DM) Video Amp Input sig check
NG
Q25, Q26, IC11, IC12 IC20 (DM)
OK
TP10 (DM) Video Output sig Level check
NG
IC21, Q605, D20, D21 (DM) VIDEO MUTING (SY)
OK
C155, C156, C157 (DM) OUTPUT CN

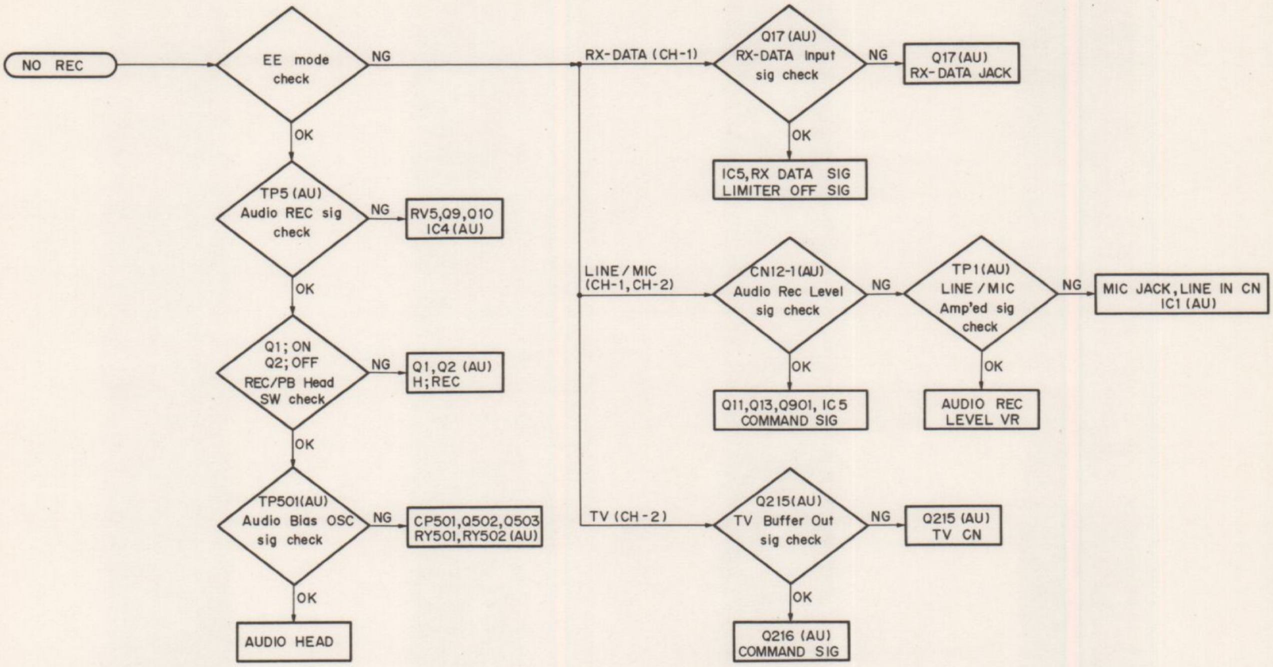
SERVO SYSTEM FLOW CHART

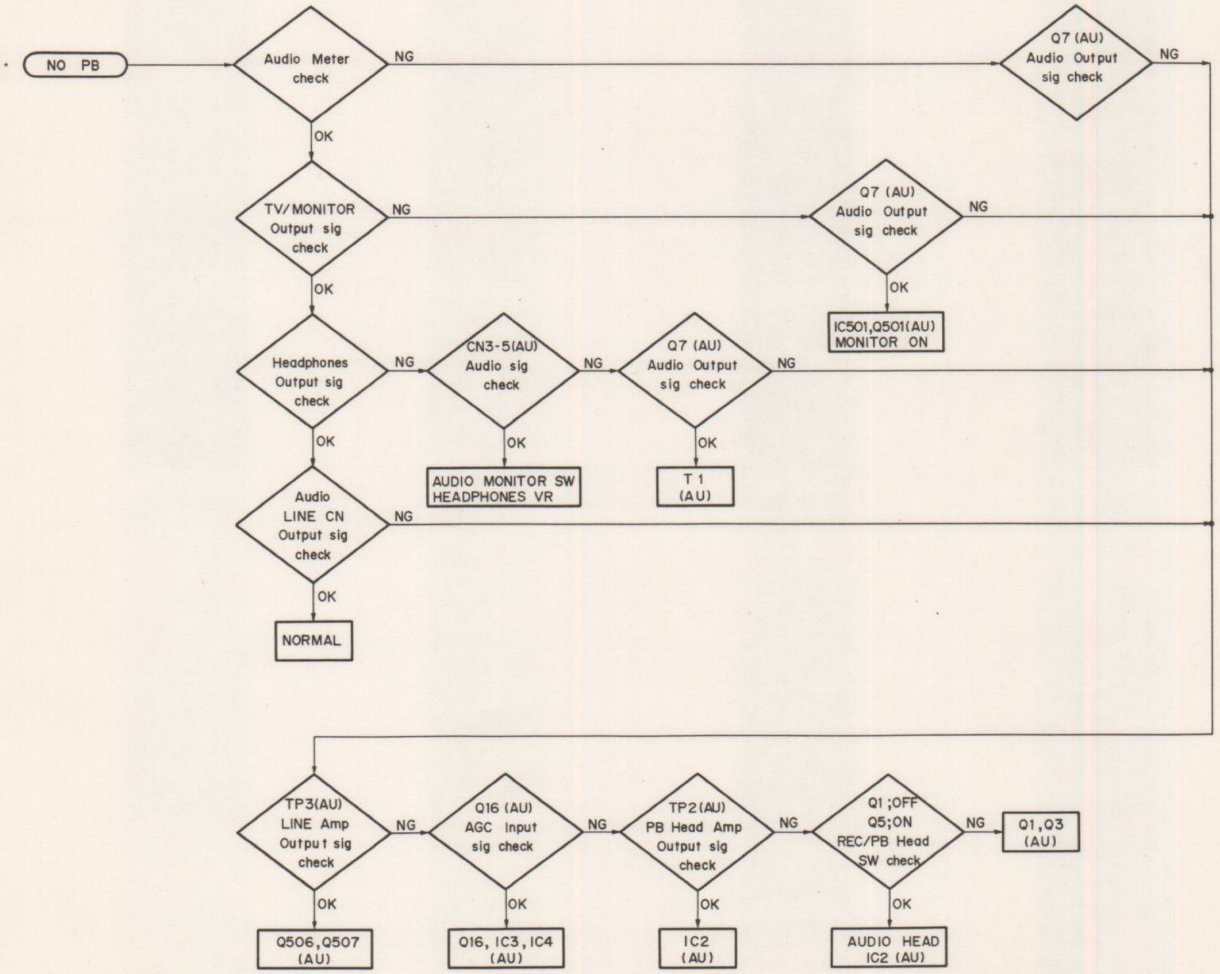
CONDITION; Clean the CTL Head. Normal Video System


DRUM ROTATION NG
TP9/SV MIN 9.0V Level check
NG
OK
DC-10 board Drum Motor
IC10-1/SV MIN 9.0V Level check
CN9-5/SV MAX 1.5V Level check
SY-68
IC10, Q505 (SV), DC-10
TP25/SV MIN 9.0V Level check
(IC10-3) 〉 (IC10-2) Level check
IC10 (SV)
(IC12-4)=(IC12-5) Level check
(IC10-7)=(IC12-5) Level check
IC12 (SV)
IC10 (SV)
IC12-9/SV MAX 3.0V Level check
IC12 (SV)
CN3-10/SV MAX 3.0V Level check
SY-68
IC3, IC23 (SV)
Base of Q504/SV MAX 0.5V Level check
D508, D509 (SV)
Q504 (SV)
CAPSTAN ROTATION NG
TP13/SV MIN 9.0V Level check
(CN8-2)-(CN8-1) =MIN 6.0V check
DC-10 CAPSTAN MOTOR
(IC14-14)-(IC14-5) =MIN 6.0V check
SY-68
IC20-13/SV MAX 1.0V Level check
Q14 (SV) DC-10
IC20-11/SV MAX 3.0V Level check
IC20 (SV)
CN11-4/SV MIN 10V Level check
Q20 (SV)
SY-68
(IC14-4)=(IC14-3) Level check
IC14-9/SV MIN 9.0V Level check
IC14 (SV)
CN11-3/SV MIN 9.0V Level check
R157 (SV)
SY-68
(IC12-15)=(IC12-2) Level check
IC11-5/SV MIN 9.0V Level check
IC11 (SV)
IC7-23/SV MAX 1.0V Level check
IC1 (SV)
IC7 (SV)
SERVO LOCK NG
TP1/SV 1/2VD Pulse check
TP8/SV Drum P-PWM Pulse check
TP16/SV Capstan P-PWM Pulse check
UN-LOCK SERVO IN PB check
CN5-4/SV REC CTL Pulse check
CN5-1/SV MAX 1.5V Level check
SY-68
IC6 (SV)
IC7-4 IC7-5 MAX 0.5V Level check
SY-68
1/2VD SW Pulse Phase check
IC7 (SV)
1/2VD SW Pulse PB CTL Phase check
IC7 (SV)
NORMAL
1/2VD (TP1)
SW Pulse
1/2VD (TP1)
SW Pulse (TP11)
PB CTL (TP2)
PB
REC
IC7-16/SV PB CTL Pulse check
TP2/SV PB CTL Pulse check
IC4, IC6 (SV)
IC6 (SV)
IC7-17 IC7-18 PG-A,B Pulse check
DC-10 CAPSTAN MOTOR
IC2-10/SV Low Level check
SY-68
IC14-9/SV High Level check
CN11-3/SV High Level check
SY-68
R157 (SV)
IC14-10 IC14-11 High Level check
CN11-4/SV High Level check
SY-68
TP27
REV
FWD
TP27/SV Timing Pulse check
IC17-3 IC17-5 Pulse check
DC-10 CAPSTAN MOTOR
IC17, IC18, IC19 IC21, IC22 (SV)
IC17-3
IC17-5
(IC12-2)=(IC12-5) Level check
IC12 (SV)
(IC12-15)=(IC14-3) Level check
IC24-1/SV MAX 1.0V Level check
IC17, IC18, IC19 IC21, IC22, (SV)
IC14 (SV)
TP18
TP18/SV Timing Pulse check
IC16 (SV)
IC23, IC24 (SV)
(IC14-3)=(IC14-4) Level check
IC14 (SV)
IC13-1
IC13-7
IC13-1 IC13-7 Pulse check
IC13 (SV)
(IC14-1) =(IC14-15) (IC14-13)=(IC14-14) check
IC14 (SV)
(IC14-15)=(CN8-1) (IC14-14)=(CN8-2) check
DC-10 CAPSTAN MOTOR
IC20-13/SV MAX 1.0V Level check
Q20, IC20 (SV)
Q14 (SV)
IC7-2 IC7-41 Pulse check
IC7-40/SV Phase PG Pulse check
PHASE PG (DRUM)
IC7-32 IC7-33 Speed PG Pulse check
RV2, RV3 IC7 (SV)
SPEED PG (DRUM)
IC7-33 IC7-32 Pulse check
IC7-31/SV Drum Free Speed Pulse check
IC7 (SV)
IC7-42/SV Low Level check
DC-10 DRUM MOTOR
CN10-1 CN3-10 Low Level check
Q2, Q3 IC3, IC23 (SV)
SY-68
IC7-28/SV CLOCK Pulse check
X1 (SV)
Pulse ; SYNC
DC ; 0.5V
IC7-3/SV Pulse or DC check
IC27 (SV)
IC7-4 or IC7-5 MAX 0.5V Level check
SY-68
Q5, IC7 (SV)

AUDIO SYSTEM FLOW CHART

CONDITION; Clean the Audio Head


NO REC
EE mode check
NG
OK
RX-DATA (CH-1)
Q17 (AU) RX-DATA Input sig check
Q17 (AU) RX-DATA JACK
IC5, RX DATA SIG LIMITER OFF SIG
TP5 (AU) Audio REC sig check
RV5, Q9, Q10 IC4 (AU)
LINE / MIC (CH-1, CH-2)
CN12-1 (AU) Audio Rec Level sig check
TP1 (AU) LINE / MIC Amp'ed sig check
MIC JACK, LINE IN CN IC1 (AU)
Q11, Q13, Q901, IC5 COMMAND SIG
AUDIO REC LEVEL VR
Q1; ON Q2; OFF REC/PB Head SW check
Q1, Q2 (AU) H; REC
TP501 (AU) Audio Bias OSC sig check
CP501, Q502, Q503 RY501, RY502 (AU)
TV (CH-2)
Q215 (AU) TV Buffer Out sig check
Q215 (AU) TV CN
Q216 (AU) COMMAND SIG
AUDIO HEAD

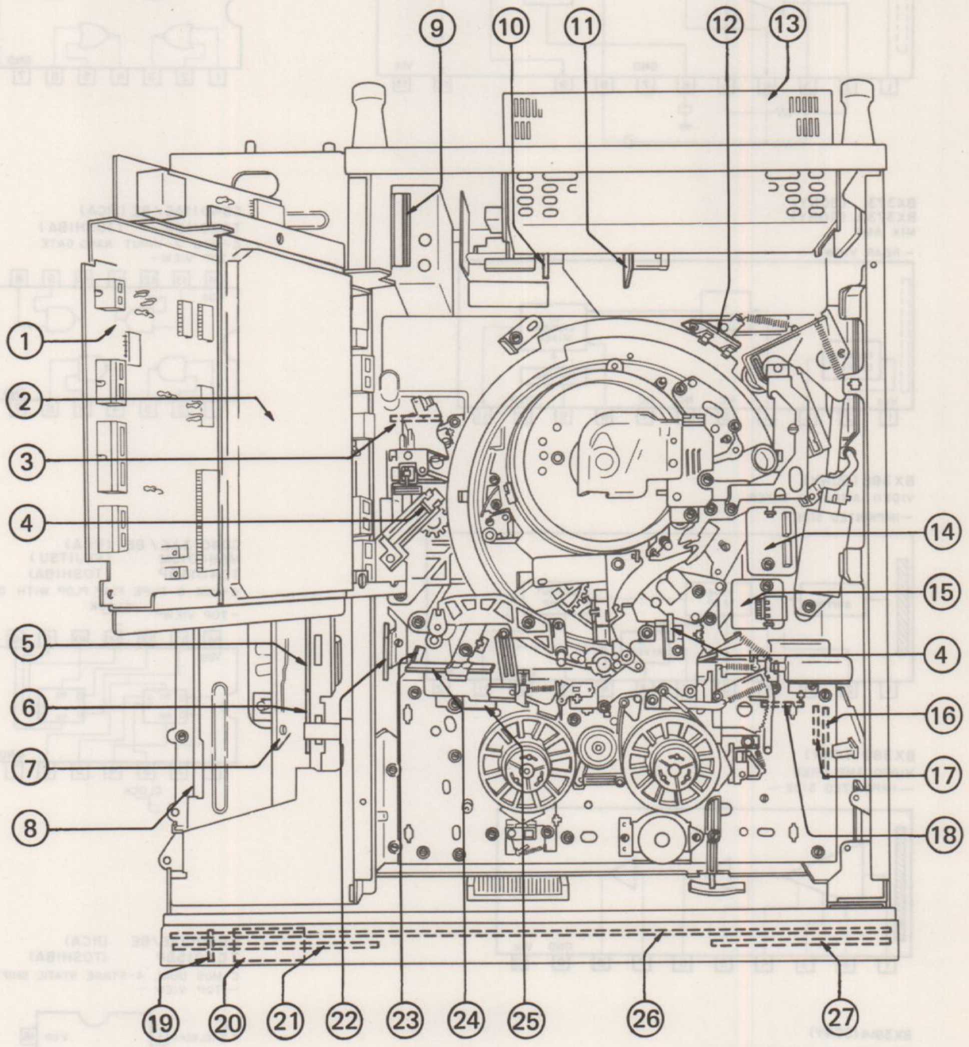

NO PB
Audio Meter check
NG
OK
Q7 (AU) Audio Output sig check
TV/MONITOR Output sig check
Q7 (AU) Audio Output sig check
IC501, Q501 (AU) MONITOR ON
Headphones Output sig check
CN3-5 (AU) Audio sig check
Q7 (AU) Audio Output sig check
AUDIO MONITOR SW HEADPHONES VR
T1 (AU)
Audio LINE CN Output sig check
NORMAL
TP3 (AU) LINE Amp Output sig check
Q16 (AU) AGC Input sig check
TP2 (AU) PB Head Amp Output sig check
Q1; OFF Q5; ON REC/PB Head SW check
Q1, Q3 (AU)
Q506, Q507 (AU)
Q16, IC3, IC4 (AU)
IC2 (AU)
AUDIO HEAD IC2 (AU)

SECTION 14

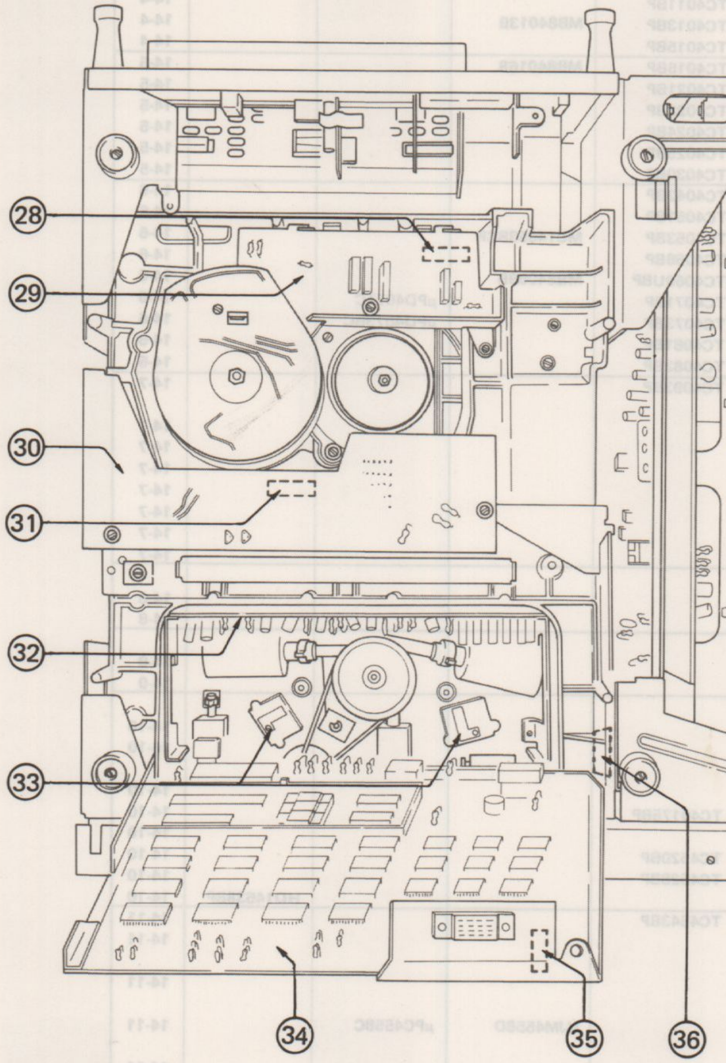
PRINTED WIRING BOARD AND SCHEMATIC DIAGRAMS

LOCATION OF MAIN PARTS

< TOP VIEW >



< REAR VIEW >



⑩ AC-27 BOARD
⑪ AC-36 BOARD or AC-35 BOARD
⑭ AH-3 BOARD
⑧ AU-21 BOARD
⑥ BS-3 BOARD
⑤ CB-6 BOARD (Mounted on MP-12A board)
⑯ CC-9 BOARD (Assembled into cassette-up compartment)
⑱ CC-10 BOARD (Assembled into cassette-up compartment)
⑰ CC-11 BOARD (Assembled into cassette-up compartment)
② CF-7 BOARD or CF-10 BOARD

⑦ CL-4 BOARD
㉙ DC-10A BOARD
⑤ DL-2 BOARD (Mounted on DM-22A board)
⑦ DM-22A BOARD
㉗ DP-10 BOARD
⑮ EC-19 BOARD
⑫ FR-11 BOARD
⑲ HP-3 BOARD
㉖ KY-13A BOARD
③ LM-7 BOARD

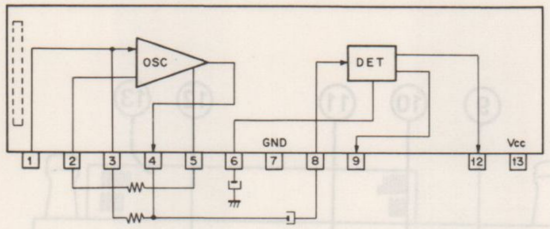
㉑ MC-17 BOARD
⑳ MI-3 BOARD
㉒ ML-1 BOARD
⑤ MP-12A BOARD
㉚ MR-6 BOARD
㉜ PD-16 BOARD
㉕ PH-4 BOARD
④ PH-5 BOARD
㉘ PT-9 (A) BOARD
㉛ PT-9 (B) BOARD

㉟ PT-9 (C) BOARD
(36) PT-9 (D) BOARD
⑨ RE-5 BOARD
① SV-31A BOARD
㉝ SW-43 BOARD
㉔ SW-46 BOARD
㉓ SW-50 BOARD
㉞ SY-68A BOARD
⑬ UR-02

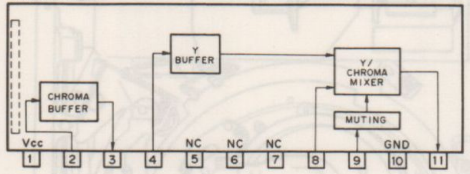
SEMICONDUCTOR ELECTRODES

TYPE	INTERCHANGEABILITY				PAGE
BX343					14-4
BX373					14-4
BX388	BX373A				14-4
BX389					14-4
BX3914					14-4
BX3915	BX3915A				14-4
CD4001AE/BE	TC4001BP	MB84001B	µPD4001C		14-4
CD4011AE/BE	TC4011BP				14-4
CD4013AE/BE	TC4013BP	MB84013B			14-4
CD4015AE/BE	TC4015BP				14-4
CD4016AE/BE	TC4016BP	MB84016B			14-5
CD4021AE/BE	TC4021BP				14-5
CD4022AE/BE	TC4022BP				14-5
CD4024AE/BE	TC4024BP				14-5
CD4025AE/BE	TC4025BP				14-5
CD4030AE/BE	TC4030BP				14-5
CD4042AE/BE	TC4042BP				14-6
CD4051BE	TC4051BP				14-6
CD4053BE	TC4053BP	MC14053BCP			14-6
CD4066AE/BE	TC4066BP				14-6
CD4069UBE	TC4069UBP	MB84069B			14-6
CD4071BE	TC4071BP		µPD4071C		14-6
CD4073BE	TC4073BP		µPD4073BC		14-6
CD4081BE	TC4081BP				14-6
CD4082BE	TC4082BP				14-6
CD4093BE	TC4093BP				14-7
CX130					14-7
CX131A					14-7
CX134A					14-7
CX135					14-7
CX188					14-7
CX859					14-7
CX872					14-7
LH0080					14-8
LH0082					14-8
MB8516					14-9
MB8747					14-9
M54516P					14-10
M54517P					14-10
MC1330P					14-10
MC14175BCP	TC40175BP				14-10
MC14503BCP					14-10
MC14520BCP	TC4520BP				14-10
MC14528BCP	TC4528BP				14-10
MC14538BCP				HD14538BP	14-10
MC14543BCP	TC4543BP				14-11
MC14584BCP					14-11
NJM2903D					14-11
RC4558		NJM4558D	µPC4558C		14-11
SN16913P					14-11
SN7404N				SN74LS04N	14-11
SN74S138N				SN74LS138N	14-11
SN74S139N				SN74LS139N	14-11
SN74LS221N					14-11
SN74LS245N					14-12
SN74390N				SN74LS390N	14-12
TA7060P	TA7060AP				14-12
TA7069P					14-12
TC40H368P					14-12
TC40H002P					14-12
TL082CP	TL082ACP/BCP	NJM4559D			14-12
LM324			µPC324C	CA324	14-12
LM358JG			µPC358C	LM358P	14-12
µPC1158H2					14-12
µPD444C					14-12

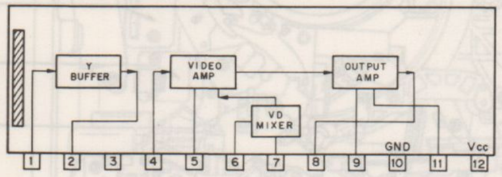
BX343 (SONY)
OSCILLATOR/DETECTOR
—REAR VIEW—


OSC
DET
GND
Vcc
1
2
3
4
5
6
7
8
9
12
13

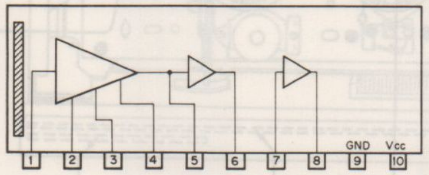
BX373 (SONY)
BX373A (SONY)
MIX AMP
- REAR VIEW-


CHROMA BUFFER
Y BUFFER
Y/ CHROMA MIXER
MUTING
Vcc
NC
NC
NC
GND
1
2
3
4
5
6
7
8
9
10
11

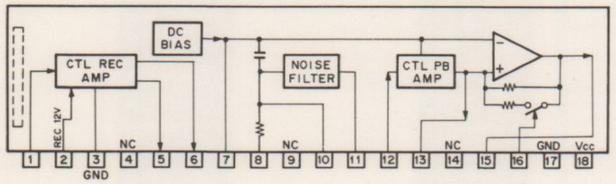
BX388 (SONY)
VIDEO AMP/ VD MIXER
-IMPRINTED SIDE-


Y BUFFER
VIDEO AMP
VD MIXER
OUTPUT AMP
GND
Vcc
1
2
3
4
5
6
7
8
9
10
11
12

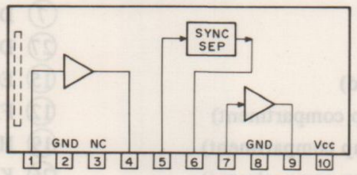
BX389 (SONY)
VIDEO AMPLIFIER
— IMPRINTED SIDE —


GND
Vcc
1
2
3
4
5
6
7
8
9
10

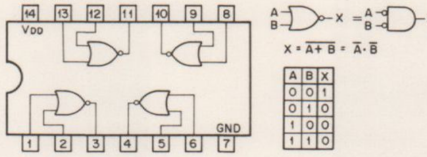
BX3914 (SONY)
CTL REC/PB AMPLIFIER
— IMPRINTED SIDE —


DC BIAS
CTL REC AMP
NOISE FILTER
CTL PB AMP
REC 12V
NC
NC
NC
GND
GND
Vcc
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18

BX3915 (SONY)
BX3915A (SONY)
SYNC SEPARATOR
-IMPRINTED SIDE-


SYNC SEP
GND
NC
GND
Vcc
1
2
3
4
5
6
7
8
9
10

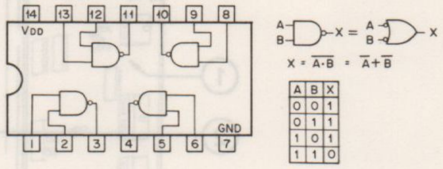
CD4001AE/BE (RCA)
TC4001BP (TOSHIBA)
µPD4001C (NEC)
MB84001B (FUJITSU)
C-MOS 2-INPUT NOR GATE
- TOP VIEW -


VDD
GND
14
13
12
11
10
9
8
1
2
3
4
5
6
7
A
B
X
A
B
X

$X = \overline{A+B} = \overline{A} \cdot \overline{B}$

A	B	X
0	0	1
0	1	0
1	0	0
1	1	0

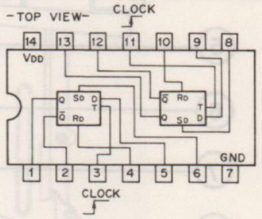
CD4011AE/BE (RCA)
TC4011BP (TOSHIBA)
C-MOS 2-INPUT NAND GATE
- TOP VIEW -


VDD
GND
14
13
12
11
10
9
8
1
2
3
4
5
6
7
A
B
X
A
B
X

$X = \overline{A \cdot B} = \overline{A} + \overline{B}$

A	B	X
0	0	1
0	1	1
1	0	1
1	1	0

CD4013AE/BE (RCA)
MB84013M (FUJITSU)
TC4013BP (TOSHIBA)
C-MOS D-TYPE FLIP FLOP WITH DIRECT SET/RESET
-TOP VIEW-


CLOCK
VDD
GND
CLOCK
Q
SD
D
T
Q̄
RD
Q̄
RD
T
Q
SD
D
14
13
12
11
10
9
8
1
2
3
4
5
6
7

DIRECT R-S FLIP FLOP

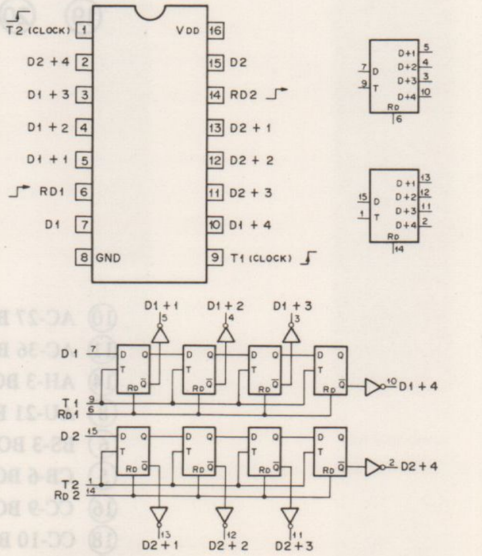
S_D	R_D	Q
0	0	Qn
0	1	0
1	0	1
1	1	0

D-TYPE FLIP FLOP

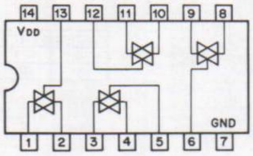
tn	tn+1
D	Q
0	0
1	1

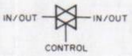
CLOCK T;
tn; BEFORE CLOCK
tn+1; AFTER CLOCK

CD4015AE/BE (RCA)
TC4015BP (TOSHIBA)
C-MOS DUAL 4-STAGE STATIC SHIFT REGISTER WITH DIRECT RESET
— TOP VIEW —


T2 (CLOCK) 1
D2 + 4 2
D1 + 3 3
D1 + 2 4
D1 + 1 5
RD1 6
D1 7
8 GND
VDD 16
15 D2
14 RD2
13 D2 + 1
12 D2 + 2
11 D2 + 3
10 D1 + 4
9 T1 (CLOCK)
D+1 5
D+2 4
D+3 3
D+4 10
D 7
T 9
RD 6
D+1 13
D+2 12
D+3 11
D+4 2
D 15
T 1
RD 14
D1 + 1
D1 + 2
D1 + 3
D1
T1
RD1
D1 + 4
D2
T2
RD 2
D2 + 4
D2 + 1
D2 + 2
D2 + 3
D
Q
T
RD
Q̄

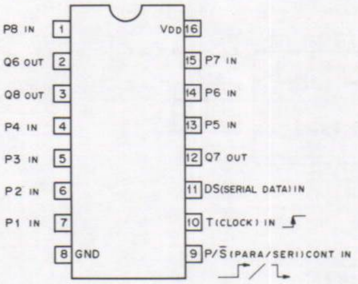
CD4016AE / BE (RCA)
MB8416B (FUJITSU)
TC4016BP (TOSHIBA)
C-MOS BILATERAL SWITCH
—TOP VIEW—

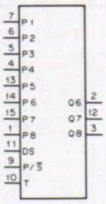

14
13
12
11
10
9
8
VDD
GND
1
2
3
4
5
6
7


IN/OUT
IN/OUT
CONTROL

CONTROL	SWITCH
0	OFF
1	ON

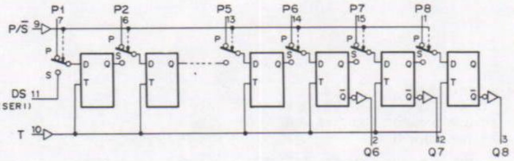
CD4021AE/BE (RCA)
TC4021BP (TOSHIBA)
C-MOS ASYNCHRONOUS PARALLEL/SYNCHRONOUS SERIAL INPUT 8-BIT STAIC SHIFT REGISTER
— TOP VIEW —


P8 IN 1
Q6 OUT 2
Q8 OUT 3
P4 IN 4
P3 IN 5
P2 IN 6
P1 IN 7
8 GND
VDD 16
15 P7 IN
14 P6 IN
13 P5 IN
12 Q7 OUT
11 DS(SERIAL DATA) IN
10 T(CLOCK) IN
9 P/S̄ (PARA/SERI) CONT IN


7 P1
6 P2
5 P3
4 P4
13 P5
14 P6
15 P7
1 P8
11 DS
9 P/S̄
10 T
Q6 2
Q7 12
Q8 3

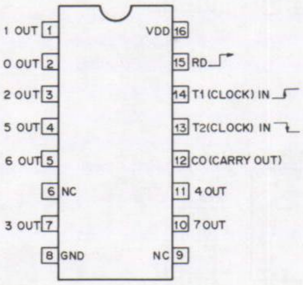
tn				tn + 1							
INPUT				INTERNAL OUTPUTS					OUTPUTS		
P/S̄ CONT	T	P	DS	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
1	X	P1 ~ P8	X	P1	P2	P3	P4	P5	P6	P7	P8
0	↑	X	1	1	Q1n	Q2n	Q3n	Q4n	Q5n	Q6n	Q7n
0	↑	X	0	0	Q1n	Q2n	Q3n	Q4n	Q5n	Q6n	Q7n
X	0	X	X	Q1n	Q2n	Q3n	Q4n	Q5n	Q6n	Q7n	Q8n

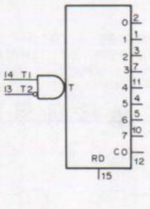
tn; BEFORE CLOCK
tn +1; AFTER CLOCK


P1
P2
P5
P6
P7
P8
P/S̄ 9
7
6
13
14
15
1
P
S
D
Q
T
Q̄
DS 11
(SERI)
T 10
2
12
3
Q6
Q7
Q8

CD4022AE/BE (RCA)
TC4022BP (TOSHIBA)
C-MOS OCTAL COUNTER/DIVIDER

—TOP VIEW—

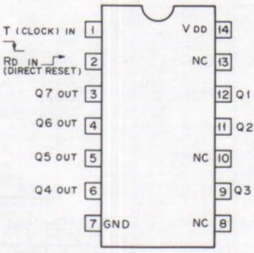

1 OUT 1
0 OUT 2
2 OUT 3
5 OUT 4
6 OUT 5
6 NC
3 OUT 7
8 GND
VDD 16
15 RD
14 T1 (CLOCK) IN
13 T2(CLOCK) IN
12 CO (CARRY OUT)
11 4 OUT
10 7 OUT
NC 9

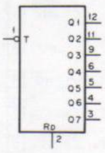

14 T1
13 T2
T
0 2
1 1
2 3
3 7
4 11
5 4
6 5
7 10
CO 12
RD
15

COUNT	INPUTS		OUTPUTS								
	RD	$T = T1 \cdot \overline{T2}$	7	6	5	4	3	2	1	0	CO
0	1	X	0	0	0	0	0	0	0	1	1
0	0	↑	0	0	0	0	0	0	0	1	1
1	0	↑	0	0	0	0	0	0	1	0	1
2	0	↑	0	0	0	0	0	1	0	0	1
3	0	↑	0	0	0	0	1	0	0	0	1
4	0	↑	0	0	0	1	0	0	0	0	0
5	0	↑	0	0	1	0	0	0	0	0	0
6	0	↑	0	1	0	0	0	0	0	0	0
7	0	↑	1	0	0	0	0	0	0	0	0
NO COUNT	0	1	NO CHANGE								
	0	0									

1: HIGH
0: LOW
X: DON'T CARE

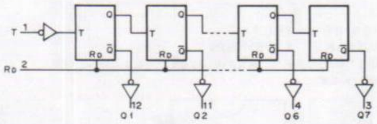
CD4024AE/BE (RCA)
TC4024BP (TOSHIBA)
C-MOS ASYNCHRONOUS 7-BIT BINARY COUNTER
—TOP VIEW—


T (CLOCK) IN 1
RD IN 2
(DIRECT RESET)
Q7 OUT 3
Q6 OUT 4
Q5 OUT 5
Q4 OUT 6
7 GND
VDD 14
NC 13
12 Q1 OUT
11 Q2 OUT
NC 10
9 Q3 OUT
NC 8

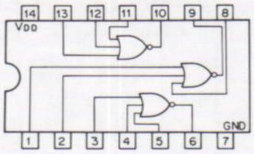

1
T
Q1 12
Q2 11
Q3 9
Q4 6
Q5 5
Q6 4
Q7 3
RD
2

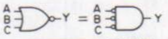
COUNT	INPUTS		OUTPUTS						
	T	RD	Q7	Q6	Q5	Q4	Q3	Q2	Q1
0	X	1	0	0	0	0	0	0	0
1	↓	0	0	0	0	0	0	0	1
2	↓	0	0	0	0	0	0	1	0
3	↓	0	0	0	0	0	0	1	1
4	↓	0	0	0	0	0	1	0	0
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
125	↓	0	1	1	1	1	1	0	1
126	↓	0	1	1	1	1	1	1	0
127	↓	0	1	1	1	1	1	1	1
—	0	0	NO CHANGE						
—	1	0							

0 ; LOW
1 ; HIGH
X ; DONT'CARE


T 1
T
Q
Q̄
RD
RD 2
12
11
4
3
Q1
Q2
Q6
Q7

CD4025AE/BE (RCA)
TC4025BP (TOSHIBA)
C-MOS 3-INPUT NOR GATE
—TOP VIEW—

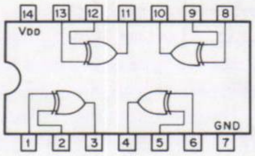

14
13
12
11
10
9
8
VDD
GND
1
2
3
4
5
6
7

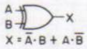


$Y = \overline{A + B + C} = \overline{A} \cdot \overline{B} \cdot \overline{C}$

A	B	C	Y
0	0	0	1
X	X	1	0
X	1	X	0
1	X	X	0

CD4030AE/BE (RCA)
TC4030BP (TOSHIBA)
C-MOS EXCLUSIVE OR GATE
—TOP VIEW—


14
13
12
11
10
9
8
VDD
GND
1
2
3
4
5
6
7

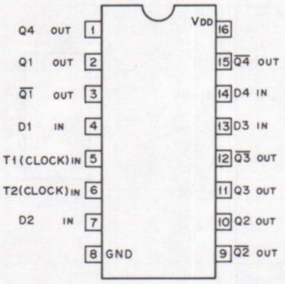


$X = \overline{A} \cdot B + A \cdot \overline{B}$

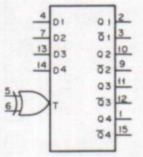
A	B	X
0	0	0
0	1	1
1	0	1
1	1	0

SEMICONDUCTOR ELECTRODES

CD4042AE/BE (RCA)
TC4042BP (TOSHIBA)
C-MOS D-TYPE LATCH
—TOP VIEW—



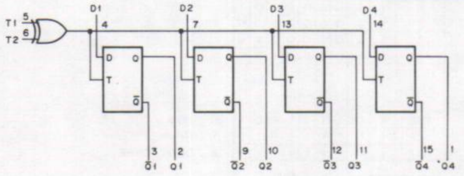
Q4 OUT 1
Q1 OUT 2
$\overline{Q1}$ OUT 3
D1 IN 4
T1(CLOCK) IN 5
T2(CLOCK) IN 6
D2 IN 7
8 GND
VDD 16
15 $\overline{Q4}$ OUT
14 D4 IN
13 D3 IN
12 $\overline{Q3}$ OUT
11 Q3 OUT
10 Q2 OUT
9 $\overline{Q2}$ OUT



4 D1
7 D2
13 D3
14 D4
5
6
T
Q1 2
$\overline{Q1}$ 3
Q2 10
$\overline{Q2}$ 9
Q3 11
$\overline{Q3}$ 12
Q4 1
$\overline{Q4}$ 15

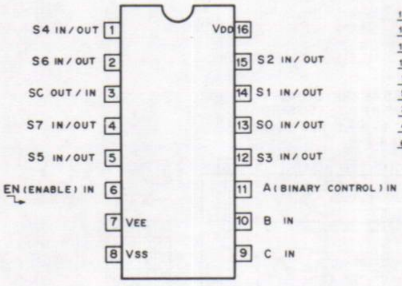
FUNCTION TABLE

T1	T2	Q / $\overline{Q}$
0	0	PASS DATA
0	1	LATCH DATA
1	0	LATCH DATA
1	1	PASS DATA

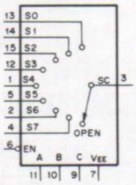


T1 5
T2 6
D1 4
D2 7
D3 13
D4 14
D Q
T
$\overline{Q}$
3 2
$\overline{Q1}$ Q1
9 10
$\overline{Q2}$ Q2
12 11
$\overline{Q3}$ Q3
15 1
$\overline{Q4}$ Q4

CD4051BE (RCA)
TC4051BP (TOSHIBA)
C-MOS 8-CHANNEL MULTIPLEXER/DEMULTIPLEXER
—TOP VIEW—



S4 IN/OUT 1
S6 IN/OUT 2
SC OUT/IN 3
S7 IN/OUT 4
S5 IN/OUT 5
$\overline{EN}$ (ENABLE) IN 6
7 VEE
8 VSS
VDD 16
15 S2 IN/OUT
14 S1 IN/OUT
13 S0 IN/OUT
12 S3 IN/OUT
11 A (BINARY CONTROL) IN
10 B IN
9 C IN

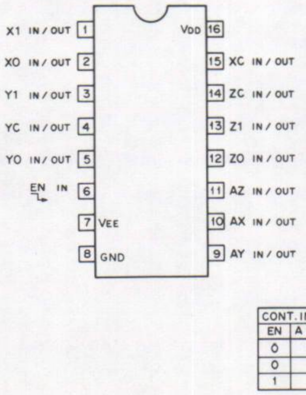


13 S0
14 S1
15 S2
12 S3
1 S4
5 S5
2 S6
4 S7
SC 3
OPEN
6 $\overline{EN}$
A B C VEE
11 10 9 7

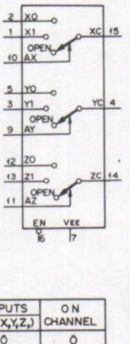
EN	C	B	A	"ON" CHANNEL
0	0	0	0	0
0	0	0	1	1
0	0	1	0	2
0	0	1	1	3
0	1	0	0	4
0	1	0	1	5
0	1	1	0	6
0	1	1	1	7
1	X	X	X	OPEN

X ; DON'T CARE
1 ; HIGH LEVEL
0 ; LOW LEVEL

CD4053BE (RCA)
MC14053BCP (MOTOROLA)
TC4053BP (TOSHIBA)
C-MOS 2-CHANNEL MULTIPLEXER/DEMULTIPLEXER
—TOP VIEW—



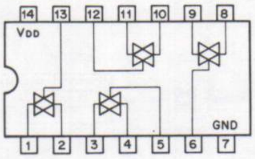
X1 IN/OUT 1
X0 IN/OUT 2
Y1 IN/OUT 3
YC IN/OUT 4
Y0 IN/OUT 5
$\overline{EN}$ IN 6
7 VEE
8 GND
VDD 16
15 XC IN/OUT
14 ZC IN/OUT
13 Z1 IN/OUT
12 Z0 IN/OUT
11 AZ IN/OUT
10 AX IN/OUT
9 AY IN/OUT



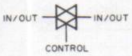
2 X0
1 X1
OPEN
10 AX
XC 15
5 Y0
3 Y1
OPEN
9 AY
YC 4
12 Z0
13 Z1
OPEN
11 AZ
ZC 14
EN VEE
6 7

CONT. INPUTS		ON CHANNEL
EN	A (X,Y,Z,)	
0	0	0
0	1	1
1	X	OPEN

CD4066AE/BE (RCA)
TC4066BP (TOSHIBA)
C-MOS BILATERAL ANALOG SWITCH
—TOP VIEW—



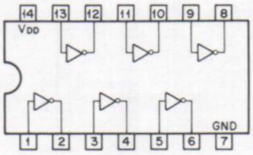
14 13 12 11 10 9 8
VDD
GND
1 2 3 4 5 6 7



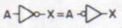
IN/OUT
IN/OUT
CONTROL

CONTROL	SWITCH
0	OFF
1	ON

CD4069UBE (RCA)
TC4069UBP (TOSHIBA)
MB84069B (FUJITSU)
C-MOS INVERTER
—TOP VIEW—



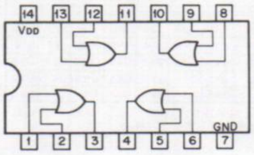
14 13 12 11 10 9 8
VDD
GND
1 2 3 4 5 6 7



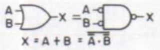
$X = \overline{A}$

A	X
0	1
1	0

CD4071BE (RCA)
TC4071BP (TOSHIBA)
μPD4071C (NEC)
C-MOS 2-INPUT OR GATE
—TOP VIEW—



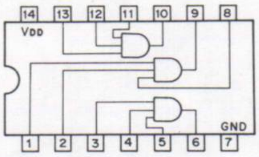
14 13 12 11 10 9 8
VDD
GND
1 2 3 4 5 6 7



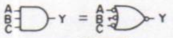
$X = A + B = \overline{\overline{A} \cdot \overline{B}}$

A	B	X
0	0	0
0	1	1
1	0	1
1	1	1

CD4073BE (RCA)
TC4073BP (TOSHIBA)
C-MOS 3-INPUT POSITIVE AND GATE
—TOP VIEW—



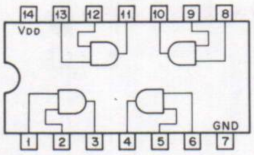
14 13 12 11 10 9 8
VDD
GND
1 2 3 4 5 6 7



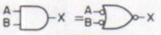
$Y = A \cdot B \cdot C = \overline{\overline{A} + \overline{B} + \overline{C}}$

A	B	C	Y
X	X	0	0
X	0	X	0
0	X	X	0
1	1	1	1

CD4081BE (RCA)
TC4081BP (TOSHIBA)
C-MOS 2-INPUT AND GATE
—TOP VIEW—



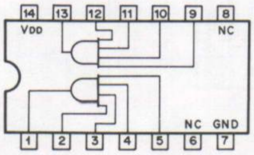
14 13 12 11 10 9 8
VDD
GND
1 2 3 4 5 6 7



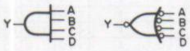
$X = A \cdot B = \overline{\overline{A} + \overline{B}}$

A	B	X
0	0	0
0	1	0
1	0	0
1	1	1

CD4082BE (RCA)
TC4082BP (TOSHIBA)
C-MOS 4-INPUT AND GATE
—TOP VIEW—



14 13 12 11 10 9 8
VDD
NC
NC GND
1 2 3 4 5 6 7



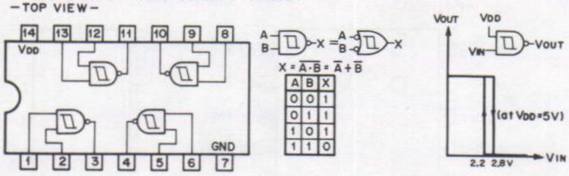
Y
A
B
C
D
Y
A
B
C
D

$Y = ABCD = \overline{\overline{A} + \overline{B} + \overline{C} + \overline{D}}$

D	C	B	A	Y
X	X	X	0	0
X	X	0	X	0
X	0	X	X	0
0	X	X	X	0
1	1	1	1	1

SEMICONDUCTOR ELECTRODES

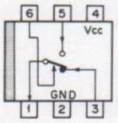
CD4093BE (RCA)
TC4093BP (TOSHIBA)
C-MOS 2-INPUT NAND SCHMITT TRIGGER
-TOP VIEW-

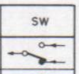
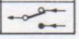

14
13
12
11
10
9
8
VDD
GND
1
2
3
4
5
6
7
A
B
X
VOUT
VDD
VIN
VOUT
(at VDD=5V)
2.2
2.8V
VIN

$X = \overline{A \cdot B} = \overline{A} + \overline{B}$

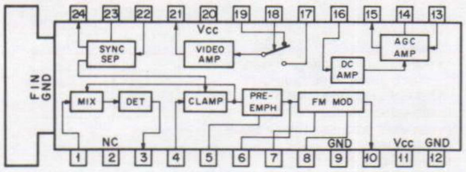
A	B	X
0	0	1
0	1	1
1	0	1
1	1	0

CX130 (SONY)
ANALOG SWITCH
-TOP VIEW-

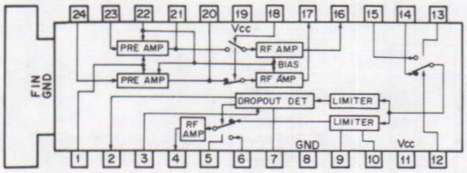

6
5
4
Vcc
GND
1
2
3

CONT. INPUT (PIN6)	SW
LOW OR OPEN	
HIGH	

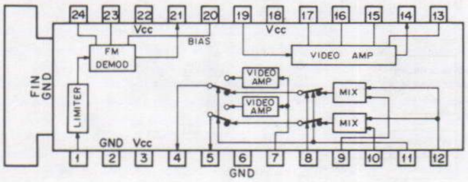
CX131A (SONY)
-TOP VIEW-


24
23
22
21
20
19
18
17
16
15
14
13
Vcc
SYNC SEP
VIDEO AMP
DC AMP
AGC AMP
FIN GND
MIX
DET
CLAMP
PRE-EMPH
FM MOD
NC
GND
Vcc
GND
1
2
3
4
5
6
7
8
9
10
11
12

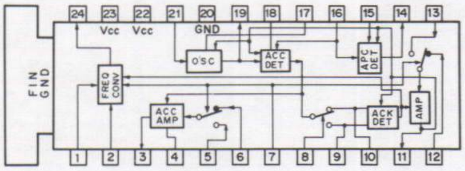
CX134A (SONY)
-TOP VIEW-


24
23
22
21
20
19
18
17
16
15
14
13
Vcc
PRE AMP
RF AMP
BIAS
PRE AMP
RF AMP
FIN GND
DROPOUT DET
LIMITER
LIMITER
RF AMP
GND
Vcc
1
2
3
4
5
6
7
8
9
10
11
12

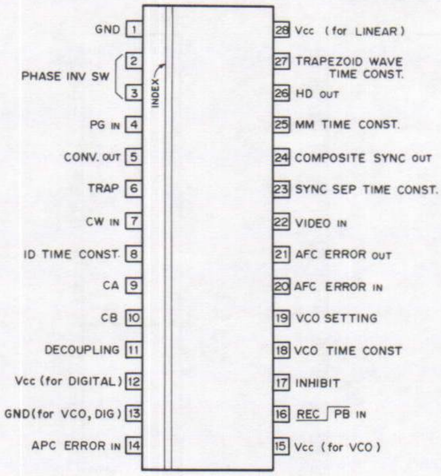
CX135 (SONY)
-TOP VIEW-

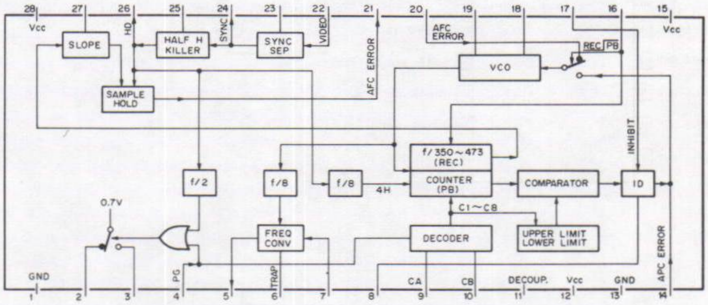

24
23
22
21
20
19
18
17
16
15
14
13
Vcc
BIAS
Vcc
FM DEMOD
VIDEO AMP
FIN GND
LIMITER
VIDEO AMP
VIDEO AMP
MIX
MIX
GND
Vcc
GND
1
2
3
4
5
6
7
8
9
10
11
12

CX188 (SONY)
-TOP VIEW-


24
23
22
21
20
19
18
17
16
15
14
13
Vcc
Vcc
GND
FIN GND
FREQ CONV
O'SC
ACC DET
APC DET
ACC AMP
ACK DET
AMP
1
2
3
4
5
6
7
8
9
10
11
12

CX859 (SONY)
-TOP VIEW-


GND 1
PHASE INV SW 2
3
PG IN 4
CONV. OUT 5
TRAP 6
CW IN 7
ID TIME CONST. 8
CA 9
CB 10
DECOUPLING 11
Vcc (for DIGITAL) 12
GND (for VCO, DIG) 13
APC ERROR IN 14
INDEX
28 Vcc (for LINEAR)
27 TRAPEZOID WAVE TIME CONST.
26 HD OUT
25 MM TIME CONST.
24 COMPOSITE SYNC OUT
23 SYNC SEP TIME CONST.
22 VIDEO IN
21 AFC ERROR OUT
20 AFC ERROR IN
19 VCO SETTING
18 VCO TIME CONST
17 INHIBIT
16 REC/PB IN
15 Vcc (for VCO)


28
27
26
25
24
23
22
21
20
19
18
17
16
15
Vcc
SLOPE
HD
HALF H KILLER
SYNC
SYNC SEP
VIDEO
AFC ERROR
AFC ERROR
VCO
REC PB
Vcc
SAMPLE HOLD
INHIBIT
f/350～473 (REC)
COUNTER (PB)
f/2
f/8
f/8
4H
COMPARATOR
ID
0.7V
C1～C8
FREQ CONV
DECODER
UPPER LIMIT LOWER LIMIT
APC ERROR
GND
PG
TRAP
CA
CB
DECOUP.
Vcc
GND
1
2
3
4
5
6
7
8
9
10
11
12
13
14

DECODER TRUTH TABLE

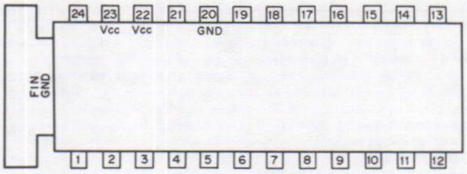
CB / CA	LOW	OPEN	HIGH
LOW	C1	C7	—
OPEN	C4	C5	C6
HIGH	—	*C2 C3	C8

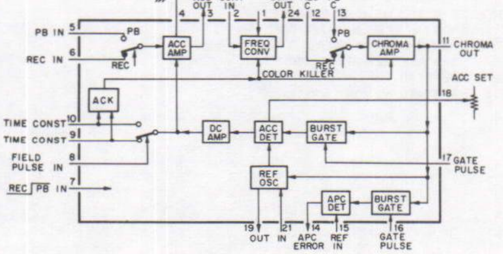
* PG : L --- C2
PG : H --- C3

AFC/APC PRESET DATA

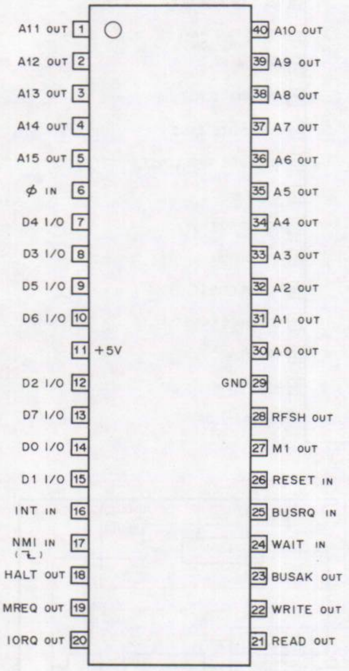
	AFC COUNT DOWN	APC ID COUNT	
		UPPER LIM.	LOWER LIM.
C1	f/473	105	95
C2	f/351	129	119
C3	f/353	137	127
C4	f/351	118	104
C5	f/351	131	117
C6	f/351	144	130
C7	f/350	136	104
C8	——	125	115

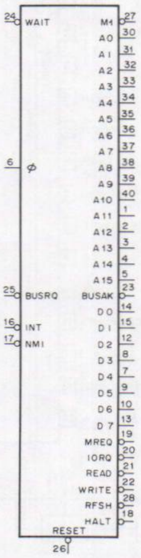
CX872 (SONY)
-TOP VIEW-


24
23
22
21
20
19
18
17
16
15
14
13
Vcc
Vcc
GND
FIN GND
1
2
3
4
5
6
7
8
9
10
11
12

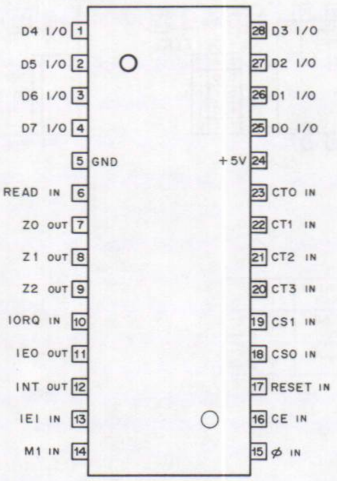

ACC OUT 3
CONV IN 2
1
CONV OUT 24
REC C 12
PB C 13
4
PB IN 5
REC IN 6
PB
REC
ACC AMP
FREQ CONV
PB
REC
CHROMA AMP
11 CHROMA OUT
COLOR KILLER
ACC SET
18
ACK
TIME CONST 10
TIME CONST 9
DC AMP
ACC DET
BURST GATE
FIELD PULSE IN 8
17 GATE PULSE
REF OSC
REC/PB IN 7
APC DET
BURST GATE
19 OUT
21 IN
14 APC ERROR
15 REF IN
16 GATE PULSE

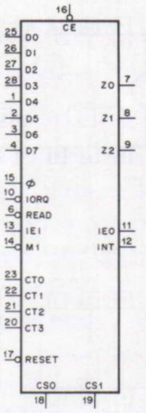
LH0080 (SHARP)
Z-80 (ZILOG)
N-MOS 8-BIT MICROPROCESSOR
— TOP VIEW —


A11 OUT 1
A12 OUT 2
A13 OUT 3
A14 OUT 4
A15 OUT 5
ϕ IN 6
D4 I/O 7
D3 I/O 8
D5 I/O 9
D6 I/O 10
11 +5V
D2 I/O 12
D7 I/O 13
D0 I/O 14
D1 I/O 15
INT IN 16
NMI IN 17
HALT OUT 18
MREQ OUT 19
IORQ OUT 20
21 READ OUT
22 WRITE OUT
23 BUSAK OUT
24 WAIT IN
25 BUSRQ IN
26 RESET IN
27 M1 OUT
28 RFSH OUT
GND 29
30 A0 OUT
31 A1 OUT
32 A2 OUT
33 A3 OUT
34 A4 OUT
35 A5 OUT
36 A6 OUT
37 A7 OUT
38 A8 OUT
39 A9 OUT
40 A10 OUT


24 WAIT
6 ϕ
25 BUSRQ
16 INT
17 NMI
M1 27
A0 30
A1 31
A2 32
A3 33
A4 34
A5 35
A6 36
A7 37
A8 38
A9 39
A10 40
A11 1
A12 2
A13 3
A14 4
A15 5
BUSAK 23
D0 14
D1 15
D2 12
D3 8
D4 7
D5 9
D6 10
D7 13
MREQ 19
IORQ 20
READ 21
WRITE 22
RFSH 28
HALT 18
RESET 26

LH0082 (SHARP)
Z-80CTC (ZILOG)
N-MOS COUNTER TIMER CIRCUIT
— TOP VIEW —

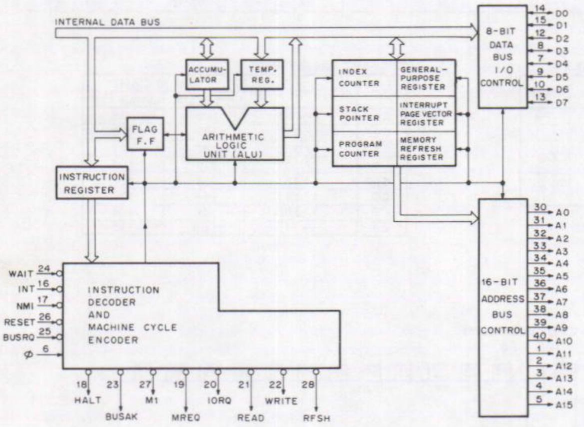

D4 I/O 1
D5 I/O 2
D6 I/O 3
D7 I/O 4
5 GND
READ IN 6
Z0 OUT 7
Z1 OUT 8
Z2 OUT 9
IORQ IN 10
IEO OUT 11
INT OUT 12
IEI IN 13
M1 IN 14
15 ϕ IN
16 CE IN
17 RESET IN
18 CS0 IN
19 CS1 IN
20 CT3 IN
21 CT2 IN
22 CT1 IN
23 CT0 IN
+5V 24
25 D0 I/O
26 D1 I/O
27 D2 I/O
28 D3 I/O


16 CE
25 D0
26 D1
27 D2
28 D3
1 D4
2 D5
3 D6
4 D7
15 ϕ
10 IORQ
6 READ
13 IEI
14 M1
23 CT0
22 CT1
21 CT2
20 CT3
17 RESET
CS0 18
CS1 19
Z0 7
Z1 8
Z2 9
IEO 11
INT 12

ϕ ; SYSTEM CLOCK
CE ; CHIP ENABLE
CS0, CS1 ; CHANNEL SELECT
CT0-CT3 ; EXTERNAL CLOCK/TIMER TRIGGER
D0-D7 ; 3-STATE DATA INPUT/OUTPUT
IEI ; INTERRUPT ENABLE INPUT
IEO ; INTERRUPT ENABLE OUTPUT
INT ; INTERRUPT REQUEST (OPEN DRAIN)
IORQ ; I/O REQUEST
M1 ; MACHINE CYCLE 1
READ ; READ CYCLE STATUS
Z0-Z2 ; ZERO COUNT/TIME OUT

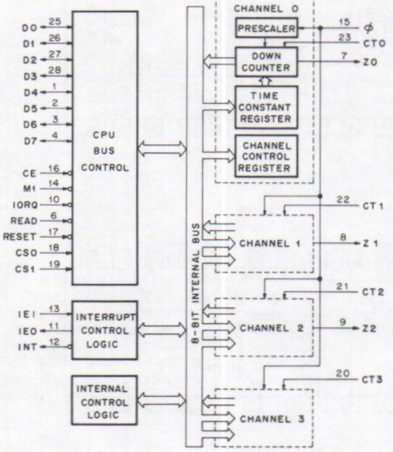
CHANNEL SELECT FUNCTION

CS1	CS0	SELECTED CHANNEL
0	0	0
0	1	1
1	0	2
1	1	3


INTERNAL DATA BUS
ACCUMULATOR
TEMP. REG.
FLAG F.F
ARITHMETIC LOGIC UNIT (ALU)
INDEX COUNTER
STACK POINTER
PROGRAM COUNTER
GENERAL-PURPOSE REGISTER
INTERRUPT PAGE VECTOR REGISTER
MEMORY REFRESH REGISTER
8-BIT DATA BUS I/O CONTROL
14 D0
15 D1
12 D2
8 D3
7 D4
9 D5
10 D6
13 D7
INSTRUCTION REGISTER
INSTRUCTION DECODER AND MACHINE CYCLE ENCODER
WAIT 24
INT 16
NMI 17
RESET 26
BUSRQ 25
ϕ 6
18 HALT
23 BUSAK
27 M1
19 MREQ
20 IORQ
21 READ
22 WRITE
28 RFSH
16-BIT ADDRESS BUS CONTROL
30 A0
31 A1
32 A2
33 A3
34 A4
35 A5
36 A6
37 A7
38 A8
39 A9
40 A10
1 A11
2 A12
3 A13
4 A14
5 A15

TEMP.REG. ; TEMPORARY REGISTER

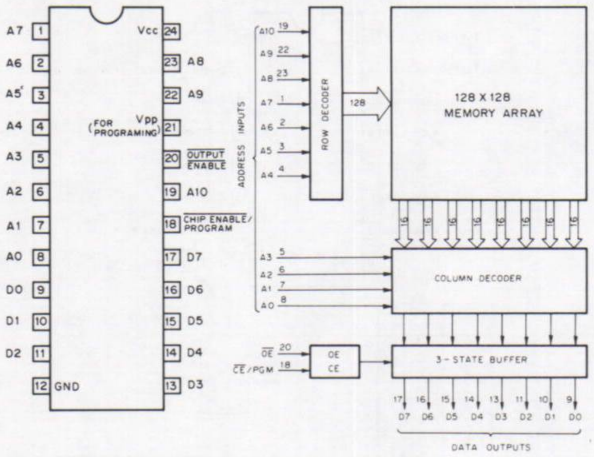
ϕ ; CLOCK
A0-A15 ; 3-STATE ADDRESS OUTPUT
BUSAK ; BUS ACKNOWLEDGE
BUSRQ ; BUS REQUEST
D0-D7 ; 3-STATE DATA INPUT/OUTPUT
HALT ; HALT STATE
INT ; INTERRUPT REQUEST
IORQ ; 3-STATE I/O REQUEST
M1 ; MACHINE CYCLE 1
MREQ ; 3-STATE MEMORY REQUEST
NMI ; NON-MASKABLE INTERRUPT
(DOWN EDGE TRIGGER)
READ ; 3-STATE MEMORY READ
RFSH ; REFRESH
WRITE ; 3-STATE MEMORY WRITE


D0 25
D1 26
D2 27
D3 28
D4 1
D5 2
D6 3
D7 4
CE 16
M1 14
IORQ 10
READ 6
RESET 17
CS0 18
CS1 19
CPU BUS CONTROL
IEI 13
IEO 11
INT 12
INTERRUPT CONTROL LOGIC
INTERNAL CONTROL LOGIC
8-BIT INTERNAL BUS
CHANNEL 0
PRESCALER
DOWN COUNTER
TIME CONSTANT REGISTER
CHANNEL CONTROL REGISTER
15 ϕ
23 CT0
7 Z0
CHANNEL 1
22 CT1
8 Z1
CHANNEL 2
21 CT2
9 Z2
CHANNEL 3
20 CT3

MB8516 (FUJITSU)

16384-BIT (2048 X 8) EPROM (3-STATE OUTPUT)

—TOP VIEW—


A7 1
A6 2
A5 3
A4 4
A3 5
A2 6
A1 7
A0 8
D0 9
D1 10
D2 11
12 GND
Vcc 24
23 A8
22 A9
Vpp (FOR PROGRAMING) 21
20 OUTPUT ENABLE
19 A10
18 CHIP ENABLE/PROGRAM
17 D7
16 D6
15 D5
14 D4
13 D3
ADDRESS INPUTS
A10 19
A9 22
A8 23
A7 1
A6 2
A5 3
A4 4
ROW DECODER
128
128 X 128
MEMORY ARRAY
16
A3 5
A2 6
A1 7
A0 8
COLUMN DECODER
OE 20
CE/PGM 18
OE
CE
3-STATE BUFFER
17 16 15 14 13 11 10 9
D7 D6 D5 D4 D3 D2 D1 D0
DATA OUTPUTS

WORD/ADDRESS TABLE

WORD	ADDRESS INPUT										
	A10	A9	A8	A7	A6	A5	A4	A3	A2	A1	A0
0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	1
2	0	0	0	0	0	0	0	0	0	1	0
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
2045	1	1	1	1	1	1	1	1	1	0	1
2046	1	1	1	1	1	1	1	1	1	1	0
2047	1	1	1	1	1	1	1	1	1	1	1

DATA CODE / ACTUAL DATA

DATA CODE		ACTUAL DATA							
		D7	D6	D5	D4	D3	D2	D1	D0
0	00	0	0	0	0	0	0	0	0
1	01	0	0	0	0	0	0	0	1
2	02	0	0	0	0	0	0	1	0
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
8	08	0	0	0	0	1	0	0	0
9	09	0	0	0	0	1	0	0	1
10	0A	0	0	0	0	1	0	1	0
11	0B	0	0	0	0	1	0	1	1
12	0C	0	0	0	0	1	1	0	0
13	0D	0	0	0	0	1	1	0	1
14	0E	0	0	0	0	1	1	1	0
15	0F	0	0	0	0	1	1	1	1
16	10	0	0	0	1	0	0	0	0
17	11	0	0	0	1	0	0	0	1
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
238	EE	1	1	1	0	1	1	1	0
239	EF	1	1	1	0	1	1	1	1
240	F0	1	1	1	1	0	0	0	0
241	F1	1	1	1	1	0	0	0	1
242	F2	1	1	1	1	0	0	1	0
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
248	F8	1	1	1	1	1	0	0	0
249	F9	1	1	1	1	1	0	0	1
250	FA	1	1	1	1	1	0	1	0
251	FB	1	1	1	1	1	0	1	1
252	FC	1	1	1	1	1	1	0	0
253	FD	1	1	1	1	1	1	0	1
254	FE	1	1	1	1	1	1	1	0
255	FF	1	1	1	1	1	1	1	1

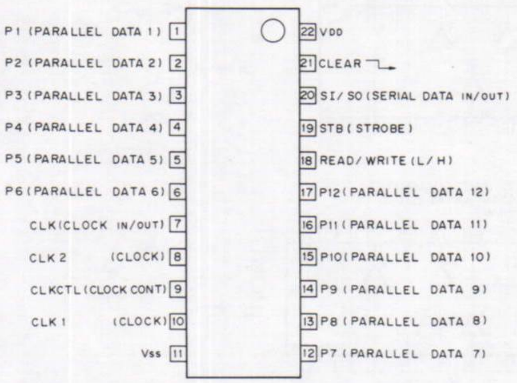
IN DECIMAL

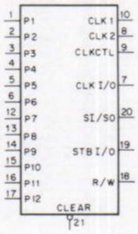
IN HEXADECIMAL

MB 8747 (FUJITSU)

C-MOS SERIAL— PARALLEL CONVERTER WITH OSCILLATER

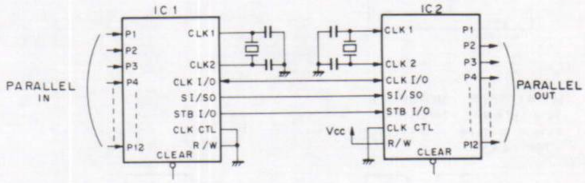
—TOP VIEW—

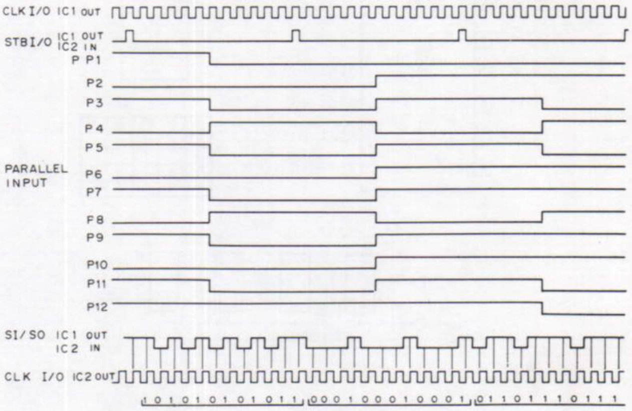

P1 (PARALLEL DATA 1) 1
P2 (PARALLEL DATA 2) 2
P3 (PARALLEL DATA 3) 3
P4 (PARALLEL DATA 4) 4
P5 (PARALLEL DATA 5) 5
P6 (PARALLEL DATA 6) 6
CLK (CLOCK IN/OUT) 7
CLK 2 (CLOCK) 8
CLKCTL (CLOCK CONT) 9
CLK 1 (CLOCK) 10
Vss 11
22 VDD
21 CLEAR
20 SI/SO (SERIAL DATA IN/OUT)
19 STB (STROBE)
18 READ/WRITE (L/H)
17 P12 (PARALLEL DATA 12)
16 P11 (PARALLEL DATA 11)
15 P10 (PARALLEL DATA 10)
14 P9 (PARALLEL DATA 9)
13 P8 (PARALLEL DATA 8)
12 P7 (PARALLEL DATA 7)


1 P1
2 P2
3 P3
4 P4
5 P5
6 P6
12 P7
13 P8
14 P9
15 P10
16 P11
17 P12
CLK 1 10
CLK 2 8
CLKCTL 9
CLK I/O 7
SI/SO 20
STB I/O 19
R/W 18
CLEAR
21

CLK CTL	CLK I/O
0	OUT
1	IN

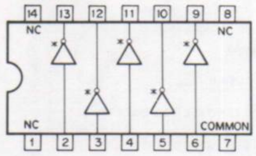
R/W	SI/SO	P1～P12	STB I/O
0	OUT	IN	OUT
1	IN	OUT	IN

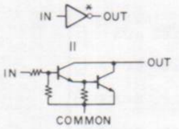

IC 1
IC 2
PARALLEL IN
P1
P2
P3
P4
P12
CLK1
CLK2
CLK I/O
SI/SO
STB I/O
CLK CTL
R/W
CLEAR
CLK 1
CLK 2
CLK I/O
SI/SO
STB I/O
CLK CTL
R/W
CLEAR
Vcc
P1
P2
P3
P4
P12
PARALLEL OUT


CLK I/O IC1 OUT
STB I/O IC1 OUT IC2 IN
P P1
P2
P3
P4
P5
PARALLEL INPUT
P6
P7
F8
P9
P10
P11
P12
SI/SO IC1 OUT IC2 IN
CLK I/O IC2 OUT
1 0 1 0 1 0 1 0 1 0 1 1
0 0 0 1 0 0 0 1 0 0 0 1
0 1 1 0 1 1 1 0 1 1 1

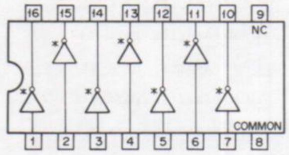
SEMICONDUCTOR ELECTRODES

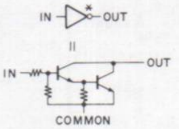
M54516P (MITSUBISHI)
TRANSISTOR ARRAY
– TOP VIEW –


14
13
12
11
10
9
8
NC
NC
NC
COMMON
1
2
3
4
5
6
7

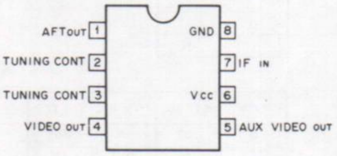

IN
OUT
IN
OUT
COMMON

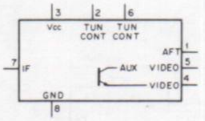
M54517P (MITSUBISHI)
TRANSISTOR ARRAY
– TOP VIEW –


16
15
14
13
12
11
10
9
NC
COMMON
1
2
3
4
5
6
7
8

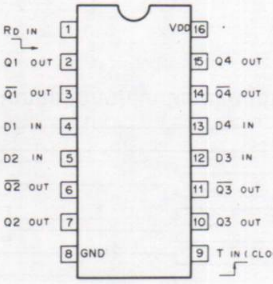

IN
OUT
IN
OUT
COMMON

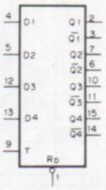
MC1330P (MOTOROLA)
LOW-LEVEL VIDEO DETECTOR
—TOP VIEW—


AFT OUT 1
TUNING CONT 2
TUNING CONT 3
VIDEO OUT 4
GND 8
7 IF IN
Vcc 6
5 AUX VIDEO OUT

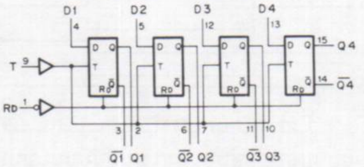

3
Vcc
2
TUN CONT
6
TUN CONT
AFT 1
7
IF
AUX VIDEO 5
VIDEO 4
GND
8

MC14175BCP (MOTOROLA)
TC40175BP (TOSHIBA)
C-MOS D-TYPE FLIP-FLOP
–TOP VIEW–

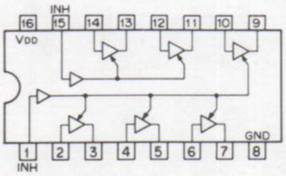

RD IN 1
Q1 OUT 2
Q̄1 OUT 3
D1 IN 4
D2 IN 5
Q̄2 OUT 6
Q2 OUT 7
8 GND
VDD 16
15 Q4 OUT
14 Q̄4 OUT
13 D4 IN
12 D3 IN
11 Q̄3 OUT
10 Q3 OUT
9 T IN (CLOCK) IN

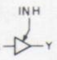

4 D1
5 D2
12 D3
13 D4
9 T
Q1 2
Q̄1 3
Q2 7
Q̄2 6
Q3 10
Q̄3 11
Q4 15
Q̄4 14
RD
1

T	D	RD	Q	Q̄	
↑	0	1	0	1	
↑	1	1	1	0	
↓	X	1	Q	Q̄	NO CHANGE
X	X	0	0	1	


D1
D2
D3
D4
4
5
12
13
T 9
RD 1
15 Q4
14 Q̄4
3
2
6
7
11
10
Q̄1 Q1
Q̄2 Q2
Q̄3 Q3

MC14503BCP (MOTOROLA)
C-MOS NON-INVERTING 3-STATE BUFFER
—TOP VIEW—

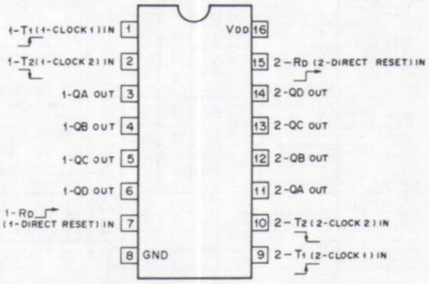

INH
16
15
14
13
12
11
10
9
VDD
GND
1
2
3
4
5
6
7
8
INH



A	INH	Y
0	0	0
1	0	1
X	1	OPEN

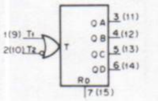
X = DON'T CARE
O = LOW LEVEL
1 = HIGH LEVEL

MC14520BCP (MOTOROLA)
TC4520BP (TOSHIBA)
C-MOS DUAL 4-BIT BINARY UP COUNTER
– TOP VIEW –


1-T1 (1-CLOCK 1) IN 1
1-T2 (1-CLOCK 2) IN 2
1-QA OUT 3
1-QB OUT 4
1-QC OUT 5
1-QD OUT 6
1-RD (1-DIRECT RESET) IN 7
8 GND
VDD 16
15 2-RD (2-DIRECT RESET) IN
14 2-QD OUT
13 2-QC OUT
12 2-QB OUT
11 2-QA OUT
10 2-T2 (2-CLOCK 2) IN
9 2-T1 (2-CLOCK 1) IN

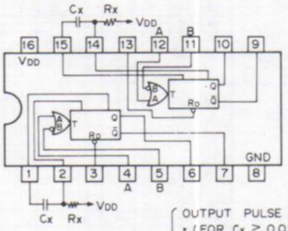
STATE	OUTPUTS			
	QD	QC	QB	QA
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

0; LOW
1; HIGH


1(9) T1
2(10) T2
T
QA 3 (11)
QB 4 (12)
QC 5 (13)
QD 6 (14)
RD
7 (15)

T1	T2	RD	ACTION
↑	1	0	INCREMENT COUNTER
0	↓	0	INCREMENT COUNTER
↓	X	0	NO CHANGE
X	↑	0	NO CHANGE
↑	0	0	NO CHANGE
1	↓	0	NO CHANGE
X	X	1	QA THRU QD = 0

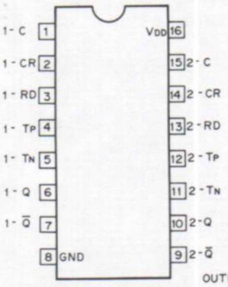
MC14528BCP (MOTOROLA)
TC4528BP (TOSHIBA)
C-MOS RETRIGGERABLE / RESETTABLE MMV
– TOP VIEW –

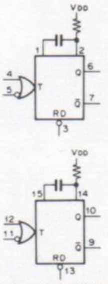

Cx
Rx
VDD
A
B
16
15
14
13
12
11
10
9
VDD
GND
1
2
3
4
5
6
7
8
A
B
Cx
Rx
VDD

INPUTS			OUTPUTS	
A	B	RD	Q	Q̄
↑	1	1	⊓	⊔
↑	0	1	Q	Q̄
1	↓	1	Q	Q̄
0	↓	1	⊓	⊔
X	X	0	0	1

OUTPUT PULSE WIDTH Q OR $\overline{Q}$
- (FOR $C_x \geqq 0.01\mu F$ USE FORMULA)
  $PW = 0.2 \cdot R_x \cdot C_x \cdot \ln(V_{DD} - GND)$
- (FOR $C_x < 0.01\mu F$ USE DATA BOOK.)

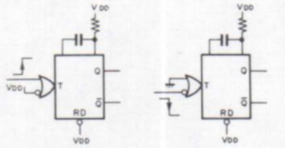
MC14538BCP (MOTOROLA)
HD14538BP (HITACHI)
C-MOS DUAL RETRIGGERABLE/NON-RETRIGGERABLE
MONOSTABLE MULTIVIBRATOR
-TOP VIEW-


1-C 1
1-CR 2
1-RD 3
1-TP 4
1-TN 5
1-Q 6
1-Q̄ 7
8 GND
VDD 16
15 2-C
14 2-CR
13 2-RD
12 2-TP
11 2-TN
10 2-Q
9 2-Q̄

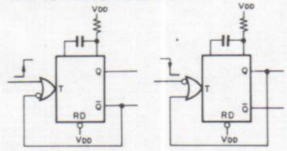

VDD
1
2
4
5
T
Q 6
Q̄ 7
RD
3
VDD
15
14
12
11
T
Q 10
Q̄ 9
RD
13

OUTPUT PULSE WIDTH=CR

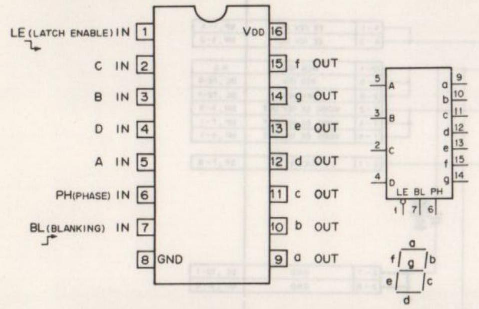
RETRIGGERABLE M.M.V


VDD
VDD
T
Q
Q̄
RD
VDD
VDD
T
Q
Q̄
RD
VDD

NON-RETRIGGERABLE M.M.V


VDD
T
Q
Q̄
RD
VDD
VDD
T
Q
Q̄
RD
VDD

MC14543BCP (MOTOROLA)
TC4543BP (TOSHIBA)
C-MOS BCD-TO-SEVEN-SEGMENT LATCH / DECODER / DRIVER
—TOP VIEW—


LE (LATCH ENABLE) IN 1
C IN 2
B IN 3
D IN 4
A IN 5
PH (PHASE) IN 6
BL (BLANKING) IN 7
8 GND
VDD 16
15 f OUT
14 g OUT
13 e OUT
12 d OUT
11 c OUT
10 b OUT
9 a OUT
A B C D LE BL PH
a b c d e f g

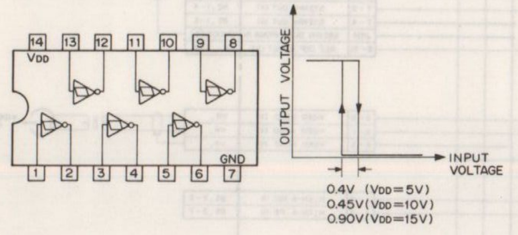
INPUTS						OUTPUTS							DISPLAY
BL	PH*	D	C	B	A	a	b	c	d	e	f	g	
1	0	X	X	X	X	0	0	0	0	0	0	0	BLANK
0	0	0	0	0	0	1	1	1	1	1	1	0	0
0	0	0	0	0	1	0	1	1	0	0	0	0	1
0	0	0	0	1	0	1	1	0	1	1	0	1	2
0	0	0	0	1	1	1	1	1	1	0	0	1	3
0	0	0	1	0	0	0	1	1	0	0	1	1	4
0	0	0	1	0	1	1	0	1	1	0	1	1	5
0	0	0	1	1	0	1	0	1	1	1	1	1	6
0	0	0	1	1	1	1	1	1	0	0	0	0	7
0	0	1	0	0	0	1	1	1	1	1	1	1	8
0	0	1	0	0	1	1	1	1	1	0	1	1	9
**	1	**				INVERSE OF OUTPUT CONBINATIONS ABOVE							DISPLAY AS ABOVE

0: LOW LEVEL
1: HIGH LEVEL
X: DON'T CARE

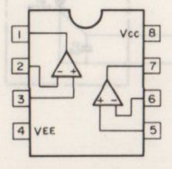
* = FOR LIQUID CRYSTAL READOUTS, APPLY A SQUARE WAVE TO PH.
FOR COMMON CATHODE LED READOUTS, SELECT PH = 0 (LOW).
FOR COMMON ANODE LED READOUTS, SELECT PH = 1 (HIGH).

** = ABOVE COMBINATIONS.

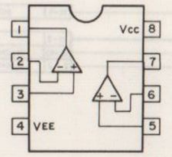
MC14584BCP (MOTOROLA)
C-MOS SCHMITT TRIGGER INVERTER
—TOP VIEW—


VDD
GND
OUTPUT VOLTAGE
INPUT VOLTAGE
0.4V (VDD=5V)
0.45V (VDD=10V)
0.90V (VDD=15V)

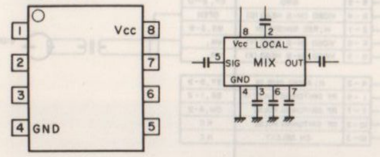
NJM2903D (JRC)
OPERATIONAL AMPLIFIER
-TOP VIEW-



NJM4558D (JRC)
µPC4558C (NEC)
OPERATIONAL AMPLIFIER
-TOP VIEW-

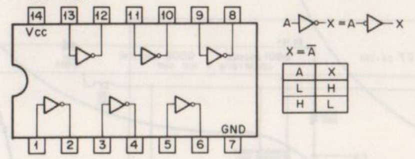


SN16913P (TI)
BALANCED MIXER
— TOP VIEW —


Vcc
GND
Vcc LOCAL
SIG MIX OUT
GND

SN7404N (TI)
SN74LS04N (TI)

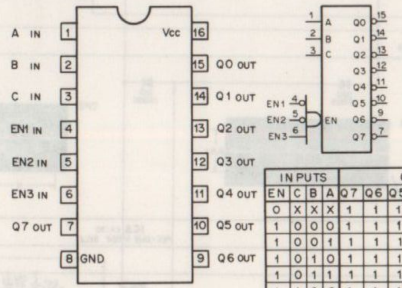
TTL INVERTER
—TOP VIEW—


Vcc
GND
A X = A X
X = $\overline{A}$

A	X
L	H
H	L

SN74S138N (TI)
SN74LS138N (TI)
TTL 3-TO-8-LINE DECODER/DEMULTIPLEXER

—TOP VIEW—

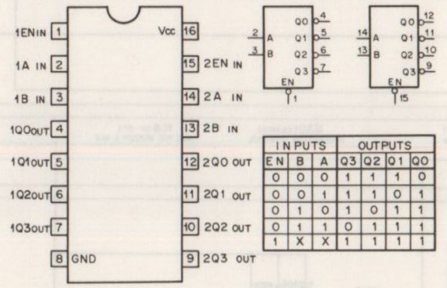

A IN
B IN
C IN
EN1 IN
EN2 IN
EN3 IN
Q7 OUT
GND
Vcc
Q0 OUT
Q1 OUT
Q2 OUT
Q3 OUT
Q4 OUT
Q5 OUT
Q6 OUT
EN1
EN2
EN3
EN

EN = $\overline{EN1} \cdot \overline{EN2} \cdot EN3$

INPUTS				OUTPUTS							
EN	C	B	A	Q7	Q6	Q5	Q4	Q3	Q2	Q1	Q0
0	X	X	X	1	1	1	1	1	1	1	1
1	0	0	0	1	1	1	1	1	1	1	0
1	0	0	1	1	1	1	1	1	1	0	1
1	0	1	0	1	1	1	1	1	0	1	1
1	0	1	1	1	1	1	1	0	1	1	1
1	1	0	0	1	1	1	0	1	1	1	1
1	1	0	1	1	1	0	1	1	1	1	1
1	1	1	0	1	0	1	1	1	1	1	1
1	1	1	1	0	1	1	1	1	1	1	1

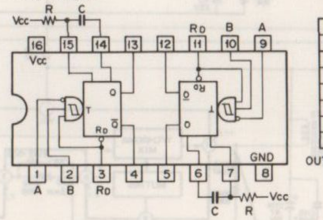
SN74S139N (TI)
SN74LS139N (TI)
TTL 2-TO-4-LINE DECODER/DEMULTIPLXER

—TOP VIEW—


1EN IN
1A IN
1B IN
1Q0 OUT
1Q1 OUT
1Q2 OUT
1Q3 OUT
GND
Vcc
2EN IN
2A IN
2B IN
2Q0 OUT
2Q1 OUT
2Q2 OUT
2Q3 OUT
A B Q0 Q1 Q2 Q3 EN

INPUTS			OUTPUTS			
EN	B	A	Q3	Q2	Q1	Q0
0	0	0	1	1	1	0
0	0	1	1	1	0	1
0	1	0	1	0	1	1
0	1	1	0	1	1	1
1	X	X	1	1	1	1

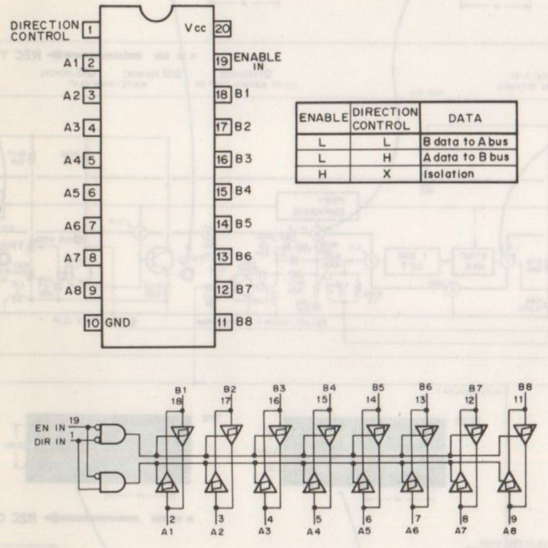
SN74LS221N (TI)
TTL MONOSTABLE MULTIVIBRATOR WITH SCHMITT TRIGGER INPUT
— TOP VIEW —


R C
Vcc
RD B A
A B RD
GND
C R Vcc

INPUTS			OUTPUTS	
RD	A	B	Q	$\overline{Q}$
L	X	X	L	H
X	H	X	L	H
X	X	L	L	H
H	L	↑	⎍	⎍
H	↓	H	⎍	⎍
↑	L	H	⎍	⎍

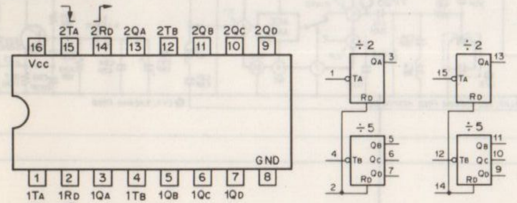
OUTPUT PULSE WIDTH = 0.7CR

SN74LS245N (TI)
TTL OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUT
— TOP VIEW —


DIRECTION CONTROL
A1 A2 A3 A4 A5 A6 A7 A8
GND
Vcc
ENABLE IN
B1 B2 B3 B4 B5 B6 B7 B8
EN IN
DIR IN

ENABLE	DIRECTION CONTROL	DATA
L	L	B data to A bus
L	H	A data to B bus
H	X	Isolation

SN74390N (TI)
SN74LS390N (TI)
TTL DIVIDE-BY-2 AND DIVIDE-BY-5 COUNTER
— TOP VIEW —


2TA 2RD 2QA 2TB 2QB 2QC 2QD
Vcc
GND
1TA 1RD 1QA 1TB 1QB 1QC 1QD
÷2
÷5
QA TA RD
QB QC QD TB RD

COUNT SEQUENCE
÷2 SECTION

COUNT	QA
0	0
1	1

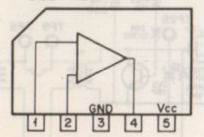
÷5 SECTION

COUNT	QD	QC	QB
0	0	0	0
1	0	0	1
2	0	1	0
3	0	1	1
4	1	0	0

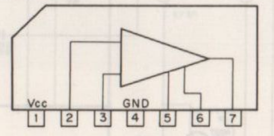
RESET/COUNT FUNCTION

RD	QD	QC	QB	QA
1	0	0	0	0
0	COUNT			

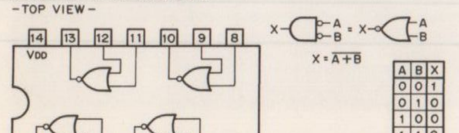
TA7060P (TOSHIBA)
TA7060AP (TOSHIBA)
LINEAR AMP
— SIDE VIEW —



TA7069P (TOSHIBA)
VIDEO AMPLIFIER
— SIDE VIEW —



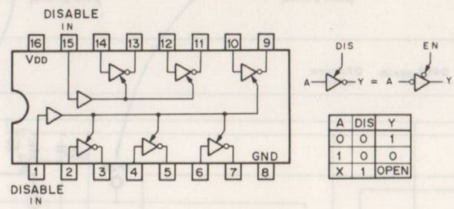
TC40H002P (TOSHIBA)
C-MOS 2-INPUT NOR GATE
-TOP VIEW-


VDD
GND
X A B = X A B
X = $\overline{A+B}$

A	B	X
0	0	1
0	1	0
1	0	0
1	1	0

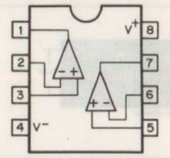
0: LOW LEVEL
1: HIGH LEVEL

TC40H368P (TOSHIBA)
C-MOS INVERTING 3-STATE BUFFER
—TOP VIEW—

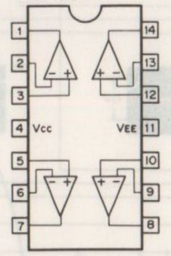

DISABLE IN
VDD
GND
DISABLE IN
DIS
EN
A Y = A Y

A	DIS	Y
0	0	1
1	0	0
X	1	OPEN

TL082CP (TI)
OPERATIONAL AMPLIFIER
(JFET-INPUT)
- TOP VIEW -

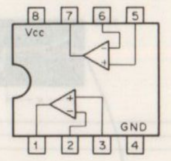


µPC324C (NEC)
QUAD. OP AMPLIFIER
—TOP VIEW—

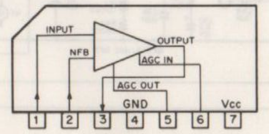


LM358P (TI)
µPC358C (NEC)
DUAL OPERATIONAL AMPLIFIERS

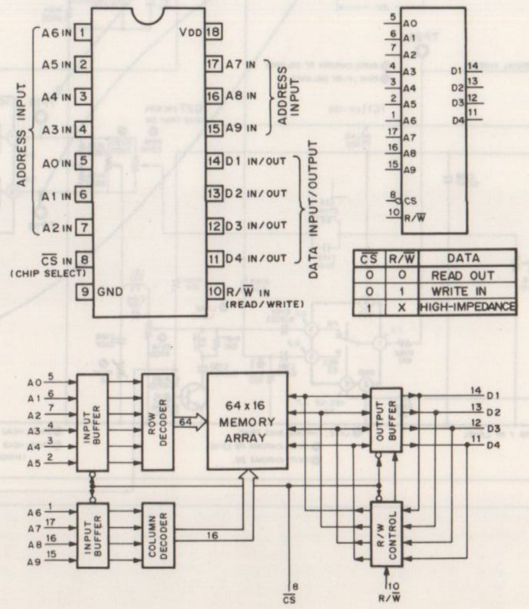
—TOP VIEW—



µPC1158H2 (NEC)
LOW NOISE PREAMPLIFIER WITH AGC
- SIDE VIEW -

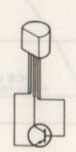

INPUT
NFB
OUTPUT
AGC IN
AGC OUT
GND
Vcc

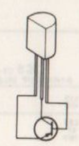
µPD444C (NEC)
C-MOS 4096-BIT (1024 x 4) STATIC RAM
- TOP VIEW -

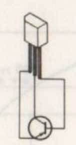

ADDRESS INPUT
A6 IN
A5 IN
A4 IN
A3 IN
A0 IN
A1 IN
A2 IN
$\overline{CS}$ IN (CHIP SELECT)
GND
VDD
A7 IN
A8 IN
A9 IN
ADDRESS INPUT
D1 IN/OUT
D2 IN/OUT
D3 IN/OUT
D4 IN/OUT
DATA INPUT/OUTPUT
R/$\overline{W}$ IN (READ/WRITE)
A0 A1 A2 A3 A4 A5 A6 A7 A8 A9
CS R/$\overline{W}$
D1 D2 D3 D4
INPUT BUFFER
ROW DECODER
64
64 x 16 MEMORY ARRAY
COLUMN DECODER
16
OUTPUT BUFFER
R/W CONTROL
$\overline{CS}$
R/$\overline{W}$

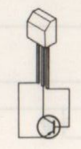
$\overline{CS}$	R/$\overline{W}$	DATA
0	0	READ OUT
0	1	WRITE IN
1	X	HIGH-IMPEDANCE

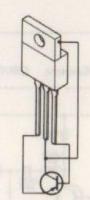
(2SA • • • , 2SB • • •)


2SA733
2SA734
2SA844

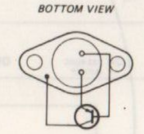

2SA773
2SB739
2SB740

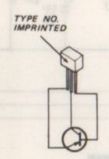

2SA678
2SA1026
2SA1027R


2SB733
2SB734

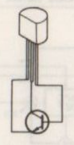

2SA671TD
2SA771
2SB507HP
2SB596
2SB856
2SB857
2SB858

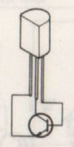
BOTTOM VIEW

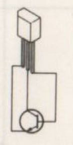

2SA762

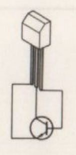

TYPE NO. IMPRINTED
2SA1174

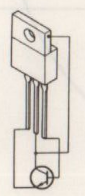
(2SC • • • , 2SD • • •)


2SC945
2SC1363
2SC1364
2SC1633
2SC1634
2SC1815

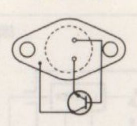

2SC1474
2SC1475
2SD788
2SD789

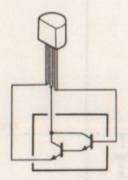

2SC403C
2SC633A
2SC634A
2SC1636

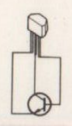

2SD773
2SD774

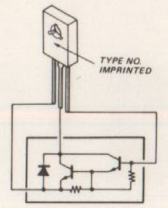

2SC1983
2SC2315

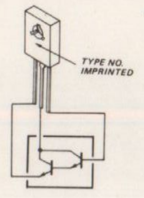
BOTTOM VIEW

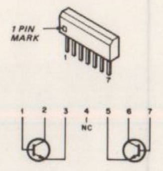

2SD256


2SD1111

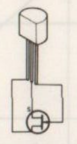

2SC1310


TYPE NO. IMPRINTED
2SD998

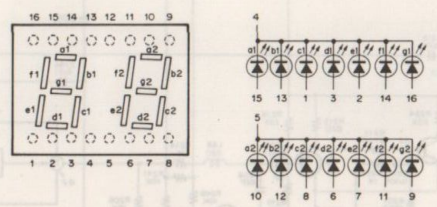

TYPE NO. IMPRINTED
2SD894

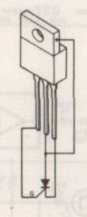

1 PIN MARK
1 2 3 4 5 6 7
NC
2SC2771

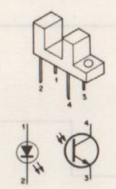
(OTHER)

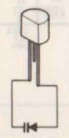

2SK43
2SK152

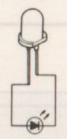
SL1222 (SANYO)
DUAL 7-SEGMENT LED
—TOP VIEW—

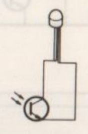

a1 b1 c1 d1 e1 f1 g1
a2 b2 c2 d2 e2 f2 g2

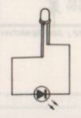

5P2M


PS4005

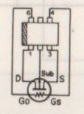

FC54M


GL-5HD5


SPS102


BR5104S

TOP VIEW



TX429D-2
TX429M

MP-12A
(VIDEO MODULATOR)
CB-6
PT-9

CB-6
REC Y MODULATOR
REC CHROMA MODULATOR
PB
PT-9 (D)
MP-12A

NOTE

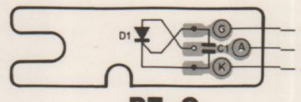
MARK	CHANGE INFORMATION	SERIAL NO.
※1	R172 470 → 100 R173 470 → 100 R184 270 → 100 C60 24P ADDED L18 220 ADDED	AEP; 10381 ~ UK; 10121 ~
※2	C48 47/16V → 1/50V	AEP; 11631 ~ UK; 10321 ~
※3	R115 1800 → 3K R118 2200 → 1K TP34 ADDED	AEP; 12081 ~ UK; 10471 ~
※4	R793 2200 → 1200 R794 1K → 750 L59 56 C209 33P ADDED R198 1800	AEP; 12531 ~ UK; 10471 ~
※5	R186 4700 → 1K	AEP; 13431 ~ UK; 10721 ~
※6	C320 47/16V ADDED	AEP; 14431 ~ UK; 10921 ~

NOTE: **The shaded and ⚠ -marked components are critical to safety.**
Replace only with same components as specified.

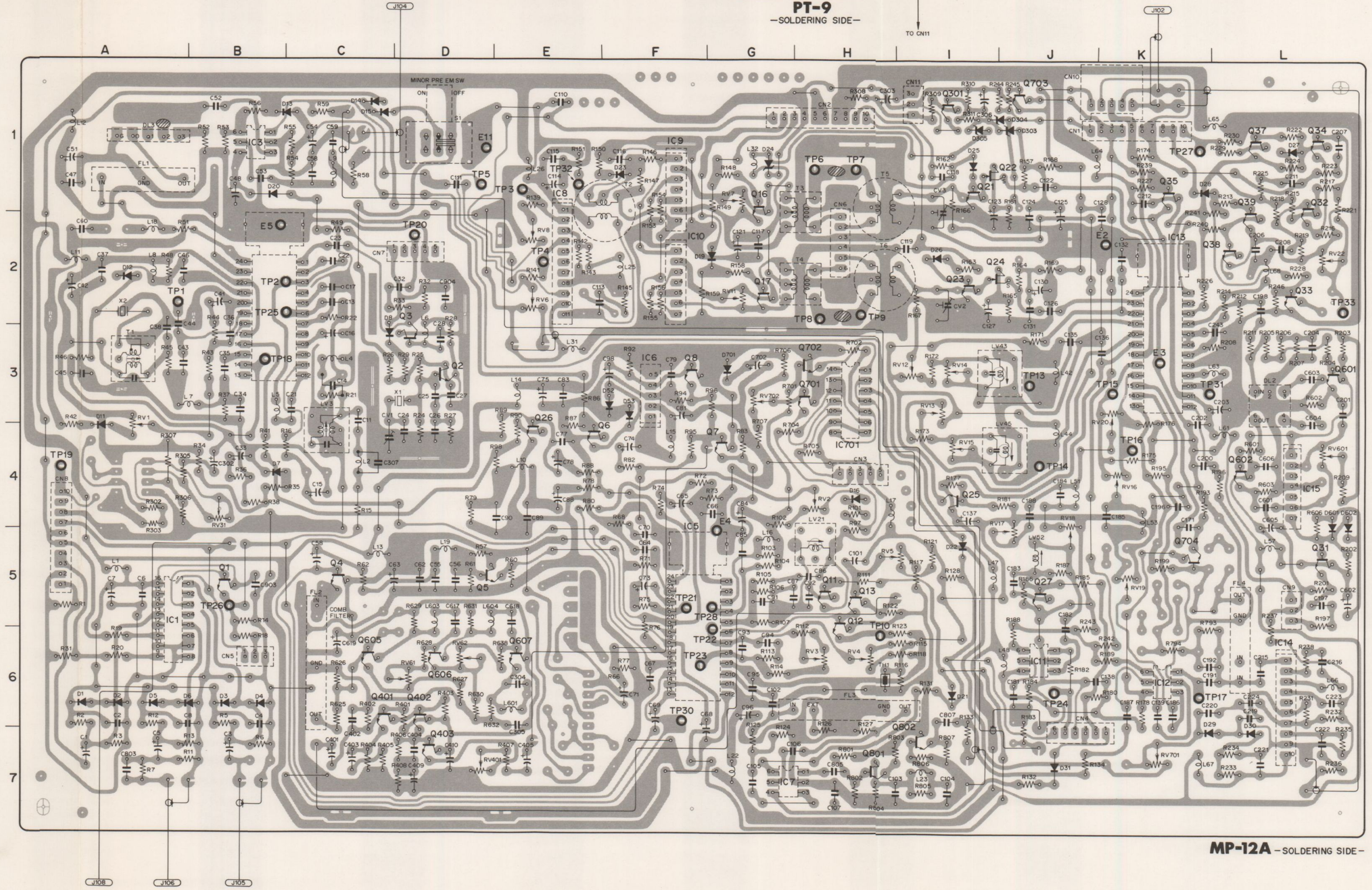
MP-12A (VIDEO MODULATOR)
CB-6
PT-9

UP TO 10180 (AEP)

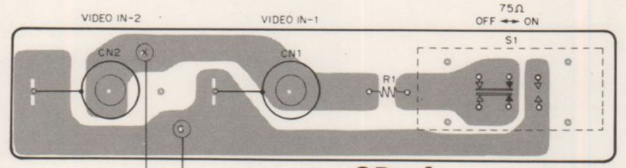
CN1	K-1
CN2	H-1
CN3	H-4
CN4	J-6
CN5	B-6
CN6	H-2
CN7	D-2
CN8	A-4
CN9	L-5
CN10	K-1
CN11	I-1
CV1	C-4
CV2	I-2
CV3	I-1
D1	A-6
D2	A-6
D3	B-6
D4	B-6
D5	A-6
D6	B-6
D7	B-4
D8	C-3
D11	A-4
D12	A-2
D13	B-1
D14	C-1
D15	C-1
D16	H-4
D18	G-1
D19	G-2
D20	B-1
D21	I-6
D22	I-4
D23	F-1
D24	G-1
D25	I-1
D26	I-2
D27	L-1
D28	K-1
D29	K-7
D30	K-7
D31	J-7
D52	F-3
D53	F-3
D303	J-1
D304	I-1
D305	I-1
D601	L-4
D602	L-4
D701	G-3
DL2	L-3
DL3	A-1
E2	J-2
E3	K-3
E4	G-4
E5	B-2
E11	D-1
FL4	L-6
IC1	A-5
IC2	B-2
IC3	B-1
IC5	G-6
IC6	F-3
IC7	G-7
IC8	E-2
IC11	J-6
IC12	K-5
IC13	K-3
IC14	L-6
IC15	L-4
IC16	A-4
IC701	H-3
LV3	C-4
LV21	H-5
LV43	J-3
LV45	J-4
LV52	J-5
Q1	B-5
Q2	D-3
Q3	D-3
Q4	C-5
Q5	F-5
Q6	F-4
Q7	G-3
Q8	G-3
Q10	F-2
Q11	H-5
Q12	H-5
Q13	H-5
Q16	G-1
Q17	G-2
Q21	I-2
Q22	I-2
Q23	I-2
Q24	J-2
Q25	I-4
Q26	E-4
Q27	J-5
Q31	L-5
Q32	L-2
Q33	L-2
Q34	L-1
Q35	K-1
Q37	L-1
Q38	L-2
Q39	L-2
Q301	I-1
Q401	D-6
Q402	D-6
Q403	D-7
Q601	L-3
Q602	L-4
Q605	C-6
Q606	D-6
Q607	E-6
Q701	H-3
Q702	H-3
Q703	J-1
Q704	K-4
Q801	H-7
Q802	H-6
RV1	A-4
RV2	H-4
RV3	H-5
RV4	H-5
RV5	I-4
RV6	E-2
RV7	G-1
RV8	E-2
RV11	G-2
RV12	I-3
RV13	I-3
RV14	I-3
RV15	I-4
RV16	K-4
RV17	J-4
RV18	J-4
RV19	K-5
RV20	K-4
RV22	L-2
RV31	B-4
RV61	D-6
RV62	D-6
RV401	E-7
RV601	L-4
RV701	K-6
RV702	G-3
S1	D-1
T1	A-3
T2	F-1
T3	H-1
T4	H-2
T5	H-1
T6	H-2
TP1	A-2
TP2	C-2
TP3	E-1
TP5	D-1
TP6	H-1
TP7	H-1
TP8	H-2
TP9	H-2
TP10	H-5
TP13	J-3
TP14	J-4
TP15	K-3
TP16	K-3
TP17	L-6
TP18	B-3
TP19	A-4
TP20	D-2
TP21	G-5
TP22	G-5
TP23	G-5
TP24	J-6
TP25	C-2
TP26	B-5
TP27	K-1
TP28	G-5
TP30	G-6
TP31	L-3
TP32	E-1
TP33	L-3
X1	D-3



PT-9 —SOLDERING SIDE—



MP-12A —SOLDERING SIDE—



CB-6 —SOLDERING SIDE—

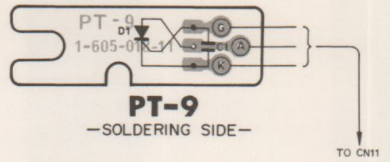
MP-12A (VIDEO MODULATOR)
CB-6
PT-9

10181 ~ 14430 (AEP)
10021 ~ 10920 (UK)

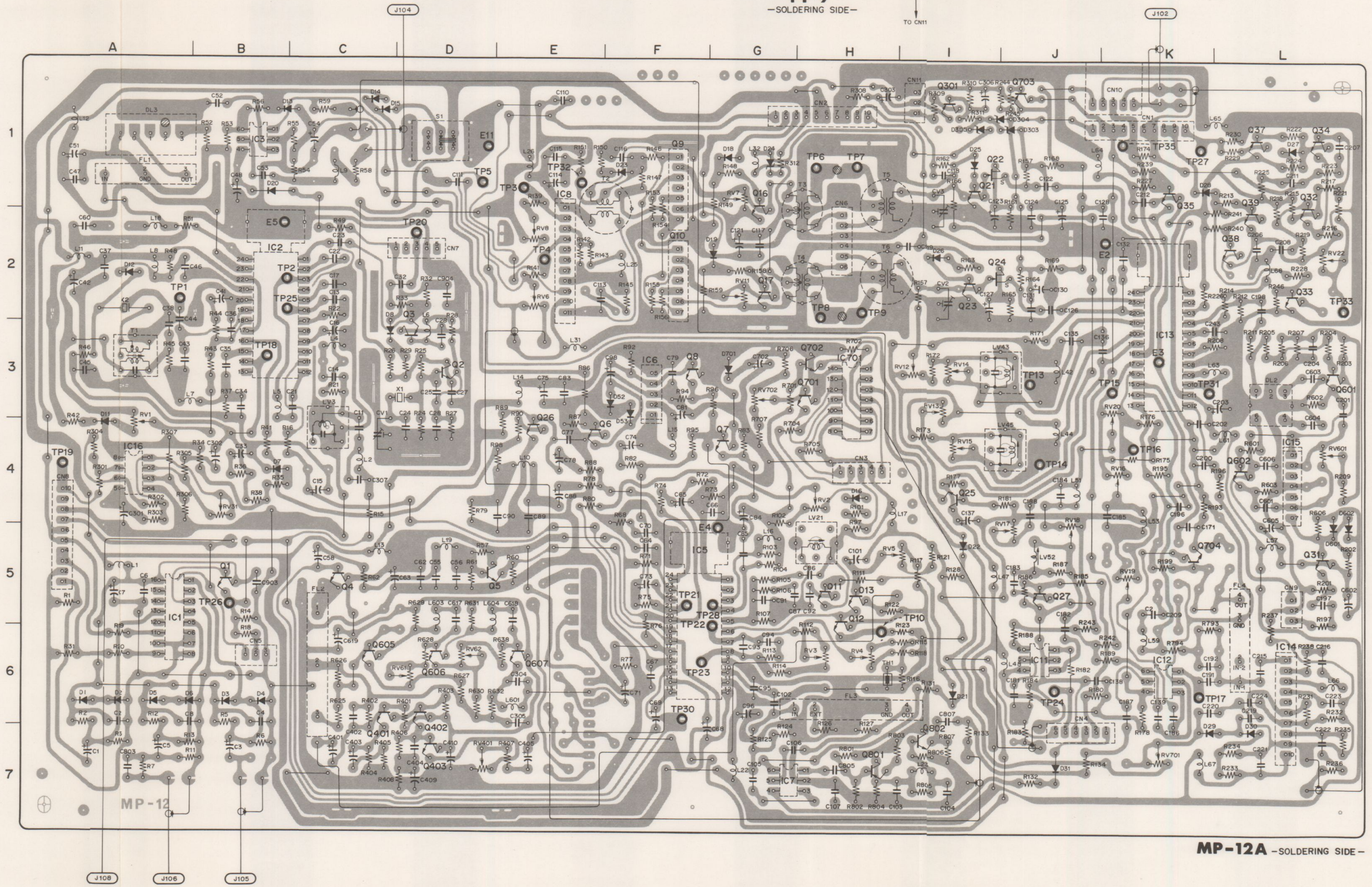
CN1	K - 1
CN2	H - 1
CN3	H - 4
CN4	J - 7
CN5	B - 6
CN6	H - 2
CN7	D - 2
CN8	A - 5
CN9	L - 5
CN10	K - 1
CV1	C - 4
D1	A - 6
D2	A - 6
D3	B - 6
D4	B - 6
D5	A - 6
D6	A - 6
D7	B - 4
D8	C - 3
D11	A - 4
D12	A - 2
D13	B - 1
D14	C - 1
D15	C - 1
D16	H - 4
D18	G - 1
D19	G - 2
D20	B - 1
D21	I - 6
D22	I - 5
D23	F - 1
D24	G - 1
D25	I - 1
D26	I - 2
D27	L - 1
D28	K - 1
D29	L - 6
D30	L - 6
D31	J - 7
D52	F - 3
D53	F - 3
D601	L - 4
D602	L - 4
D701	G - 3
DL1	E - 5
DL2	L - 3
DL3	A - 1
E2	K - 2
E3	K - 3
E4	G - 5
E5	B - 2
E11	D - 1
FL1	A - 1
FL2	D - 5
FL3	H - 6
FL4	L - 5

IC1	A - 5
IC2	B - 2
IC3	B - 1
IC4	E - 6
IC5	F - 5
IC6	F - 3
IC7	G - 7
IC8	E - 2
IC9	F - 1
IC10	F - 2
IC11	J - 6
IC12	K - 6
IC13	K - 3
IC14	L - 6
IC15	L - 4
IC701	H - 3
LV3	C - 4
LV21	H - 5
LV43	J - 3
LV45	J - 4
LV52	J - 5
Q1	B - 5
Q2	D - 3
Q3	D - 3
Q4	C - 5
Q5	D - 5
Q6	E - 4
Q7	G - 4
Q8	F - 3
Q11	H - 5
Q12	H - 6
Q13	H - 5
Q16	G - 1
Q17	G - 2
Q21	I - 1
Q22	J - 1
Q23	I - 2
Q24	J - 2
Q25	I - 4
Q26	E - 4
Q27	J - 5
Q31	L - 5
Q32	L - 1
Q33	L - 2
Q34	L - 1
Q35	K - 1
Q37	L - 1
Q38	L - 2
Q39	L - 1
Q401	C - 6
Q402	D - 6
Q403	D - 7
Q601	L - 3
Q602	L - 4
Q701	H - 3
Q702	H - 3
Q703	J - 1
Q704	K - 5
Q801	H - 7
Q802	I - 7

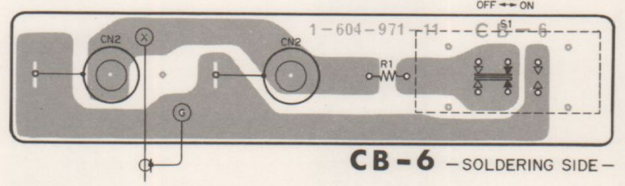
RV1	A - 4
RV2	H - 4
RV3	H - 6
RV4	H - 6
RV5	H - 5
RV6	E - 2
RV7	G - 1
RV8	E - 2
RV11	G - 2
RV12	I - 3
RV13	I - 3
RV14	I - 3
RV15	I - 4
RV16	K - 4
RV17	J - 5
RV18	J - 5
RV19	K - 5
RV20	K - 3
RV22	L - 2
RV64	E - 7
RV401	D - 7
RV601	L - 4
RV701	K - 7
RV702	G - 3
SW1	D - 1
T1	A - 3
T2	E - 1
T3	H - 1
T4	H - 2
T5	H - 1
T6	H - 2
TP1	A - 2
TP2	B - 2
TP3	E - 1
TP4	E - 2
TP5	D - 1
TP6	H - 1
TP7	H - 1
TP8	H - 2
TP9	H - 2
TP10	H - 6
TP13	J - 3
TP14	J - 4
TP15	K - 3
TP16	K - 4
TP17	K - 6
TP18	B - 3
TP19	A - 4
TP20	D - 2
TP21	F - 5
TP22	G - 6
TP23	F - 6
TP24	J - 6
TP25	B - 2
TP26	B - 5
TP27	K - 1
TP28	G - 5
TP30	F - 6
TP31	K - 3
TP32	E - 1
TP33	L - 2
X1	D - 3
X2	A - 2



PT-9 –SOLDERING SIDE–



MP-12A –SOLDERING SIDE–

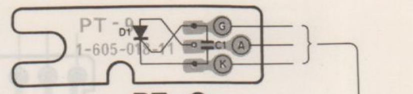


CB-6 –SOLDERING SIDE–

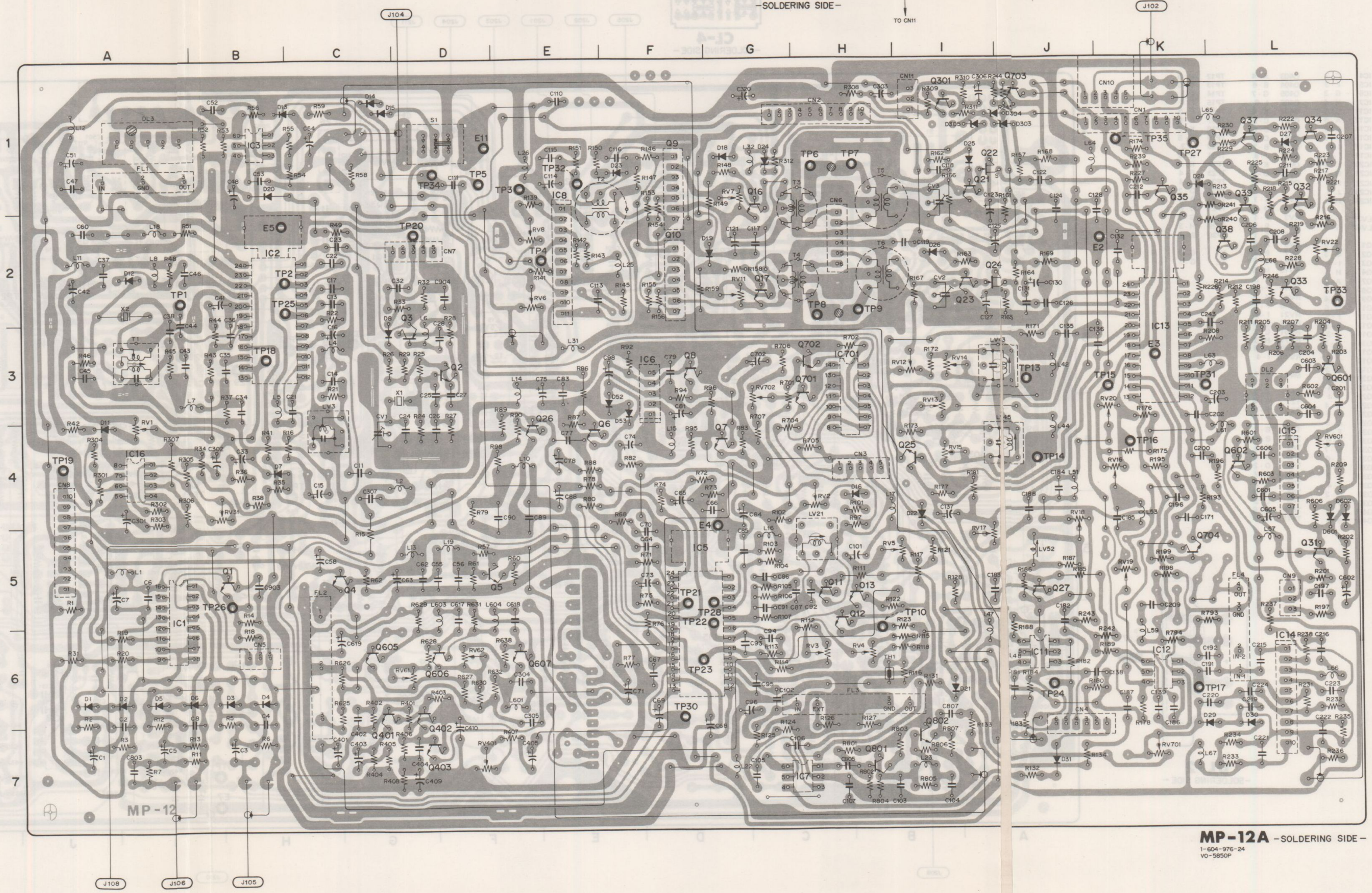
MP-12A (VIDEO MODULATOR)
CB-6
PT-9

14431 AND LATER (AEP)
10921 AND LATER (UK)

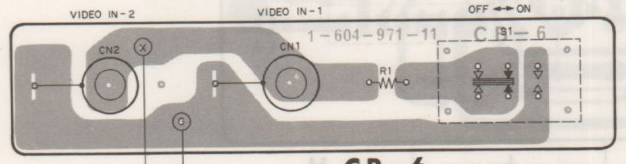
CN1	K-1
CN2	H-1
CN3	H-4
CN4	J-7
CN5	B-6
CN6	H-2
CN7	D-2
CN8	A-5
CN9	L-5
CN10	K-1
CV1	C-4
D1	A-6
D2	A-6
D3	B-6
D4	B-6
D5	A-6
D6	A-6
D7	B-4
D8	C-3
D11	A-4
D12	A-2
D13	B-1
D14	C-1
D15	C-1
D16	H-4
D18	G-1
D19	G-2
D20	B-1
D21	I-6
D22	I-5
D23	F-1
D24	G-1
D25	I-1
D26	I-2
D27	L-1
D28	K-1
D29	L-6
D30	L-6
D31	J-7
D52	F-3
D53	F-3
D601	L-4
D602	L-4
D701	G-3
DL1	E-5
DL2	L-3
DL3	A-1
E2	K-2
E3	K-3
E4	G-5
E5	B-2
E11	D-1
FL1	A-1
FL2	D-5
FL3	H-6
FL4	L-5
IC1	A-5
IC2	B-2
IC3	B-1
IC4	E-6
IC5	F-5
IC6	F-3
IC7	G-7
IC8	E-2
IC9	F-1
IC10	F-2
IC11	J-6
IC12	K-6
IC13	K-3
IC14	L-6
IC15	L-4
IC701	H-3
LV3	C-4
LV21	H-5
LV43	J-3
LV45	J-4
LV52	J-5
Q1	B-5
Q2	D-3
Q3	D-3
Q4	C-5
Q5	D-5
Q6	E-4
Q7	G-4
Q8	F-3
Q11	H-5
Q12	H-6
Q13	H-5
Q16	G-1
Q17	G-2
Q21	I-1
Q22	J-1
Q23	I-2
Q24	J-2
Q25	I-4
Q26	E-4
Q27	J-5
Q31	L-5
Q32	L-1
Q33	L-2
Q34	L-1
Q35	K-1
Q37	L-1
Q38	L-2
Q39	L-1
Q401	C-6
Q402	D-6
Q403	D-7
Q601	L-3
Q602	L-4
Q701	H-3
Q702	H-3
Q703	J-1
Q704	K-5
Q801	H-7
Q802	I-7
RV1	A-4
RV2	H-4
RV3	H-6
RV4	H-6
RV5	H-5
RV6	E-2
RV7	G-1
RV8	E-2
RV11	G-2
RV12	I-3
RV13	I-3
RV14	I-3
RV15	I-4
RV16	K-4
RV17	J-5
RV18	J-5
RV19	K-5
RV20	K-3
RV22	L-2
RV64	E-7
RV401	D-7
RV601	L-4
RV701	K-7
RV702	G-3
SW1	D-1
T1	A-3
T2	E-1
T3	H-1
T4	H-2
T5	H-1
T6	H-2
TP1	A-2
TP2	B-2
TP3	E-1
TP4	E-2
TP5	D-1
TP6	H-1
TP7	H-1
TP8	H-2
TP9	H-2
TP10	H-6
TP13	J-3
TP14	J-4
TP15	K-3
TP16	K-4
TP17	K-6
TP18	B-3
TP19	A-4
TP20	D-2
TP21	F-5
TP22	G-6
TP23	F-6
TP24	J-6
TP25	B-2
TP26	B-5
TP27	K-1
TP28	G-5
TP30	F-6
TP31	K-3
TP32	E-1
TP33	L-2
TP34	D-1
X1	D-3
X2	A-2



PT-9 -SOLDERING SIDE-



MP-12A -SOLDERING SIDE-



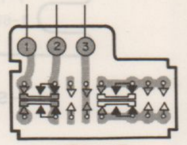
CB-6 -SOLDERING SIDE-

NOTE: The shaded and ⚠-marked components are critical to safety.
Replace only with same components as specified.

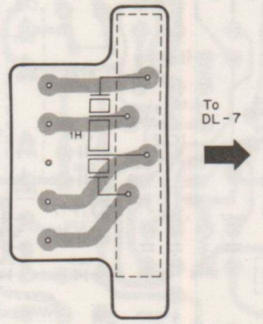
DM-22A (VIDEO DEMODULATOR)
DL-2
CL-4

UP TO 10180 (AEP)

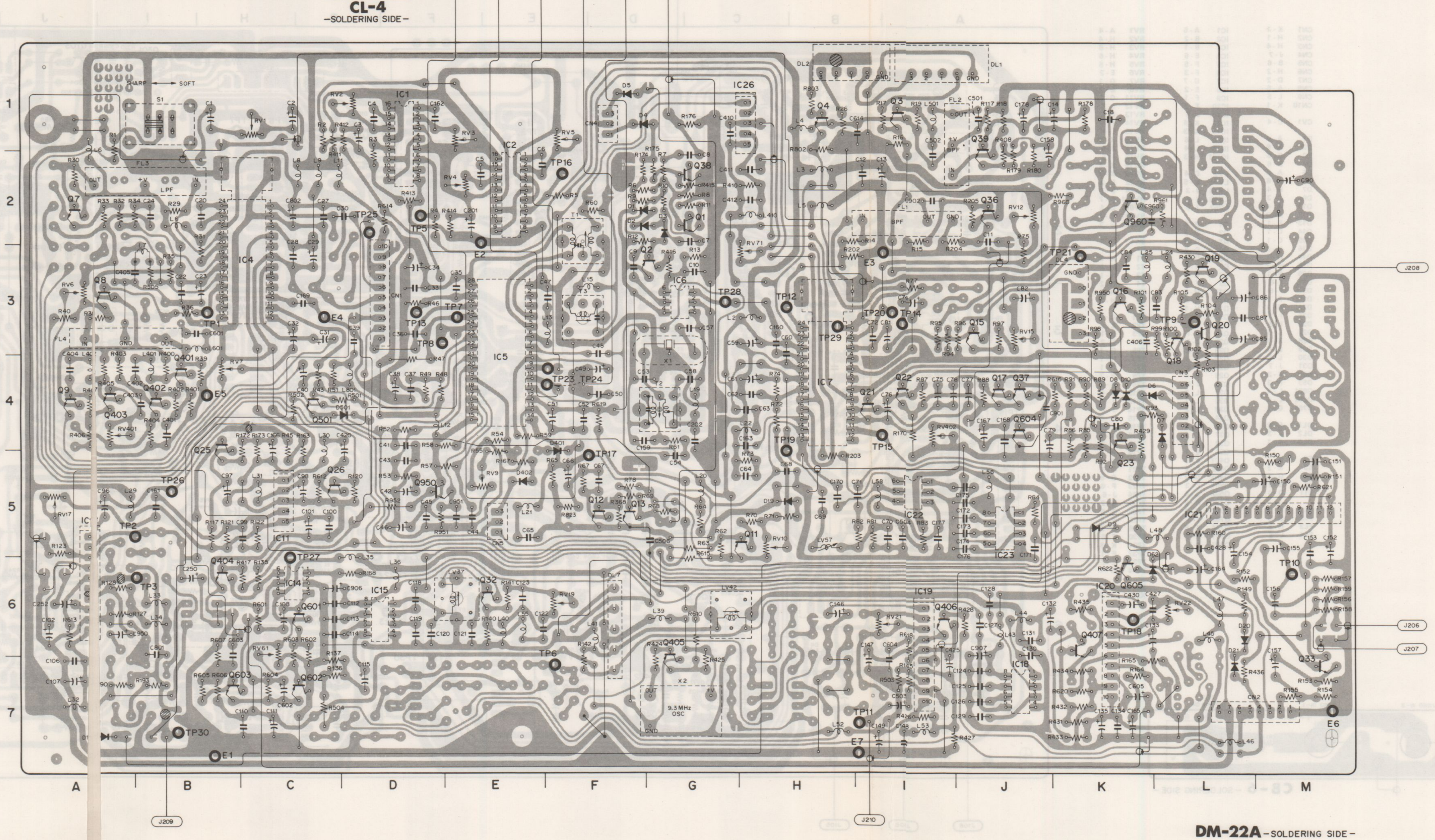
Ref.	Location
CV1	K-6
CN1	D-3
CN2	L-7
CN3	L-4
CN4	F-1
CN5	E-5
D1	G-2
D2	G-2
D3	G-2
D4	G-1
D5	F-1
D6	L-4
D7	L-4
D8	K-4
D9	L-5
D10	K-4
D11	K-3
D17	E-7
D18	E-7
D19	H-5
D20	L-6
D21	L-7
D61	F-6
D62	L-6
D401	F-5
D402	E-5
D501	D-4
DL1	I-1
DL2	I-1
DL4	K-3
DL7	F-6
E1	B-7
E2	E-2
E3	I-3
E4	C-3
E5	B-4
E6	M-7
E7	I-7
E8	E-5
FL1	I-2
FL2	J-1
FL3	B-2
FL4	A-3
IC1	D-1
IC2	E-2
IC4	C-3
IC5	E-3
IC6	G-3
IC7	H-4
IC11	C-5
IC12	A-6
IC14	C-6
IC15	D-6
IC18	J-7
IC19	I-6
IC20	K-6
IC21	M-5
IC22	I-5
IC23	J-5
IC26	H-1
LV37	E-6
LV42	G-6
Q1	G-2
Q2	G-3
Q3	I-1
Q4	H-1
Q7	A-2
Q8	A-3
Q9	A-4
Q11	H-5
Q12	F-5
Q13	F-5
Q15	J-3
Q16	K-3
Q17	J-4
Q18	L-3
Q19	L-3
Q20	L-3
Q21	I-4
Q22	I-4
Q23	K-4
Q25	B-5
Q26	C-5
Q31	F-7
Q32	E-6
Q33	M-7
Q34	L-6
Q35	L-7
Q36	J-2
Q37	J-4
Q38	G-2
Q39	J-2
Q401	B-4
Q402	B-4
Q403	A-4
Q404	B-6
Q405	G-7
Q406	I-6
Q407	K-6
Q501	C-4
Q601	C-6
Q602	C-7
Q603	B-7
Q604	J-4
Q605	K-6
Q950	D-5
Q960	K-2
RV1	C-1
RV2	D-1
RV3	E-1
RV4	E-2
RV5	F-1
RV6	A-3
RV7	B-4
RV9	E-5
RV10	H-5
RV12	J-2
RV15	J-3
RV17	A-5
RV19	F-6
RV21	I-6
RV22	L-6
RV61	C-7
RV71	H-3
RV401	A-4
RV402	I-4
SW1	B-1
T1	F-2
T2	G-4
T3	F-3
TP1	B-3
TP2	B-5
TP3	B-6
TP4	D-4
TP5	D-2
TP6	F-7
TP7	E-3
TP8	D-3
TP9	L-3
TP10	M-6
TP11	I-7
TP12	H-3
TP13	D-3
TP14	I-3
TP15	I-4
TP16	F-2
TP17	F-5
TP18	K-6
TP19	H-5
TP20	I-3
TP21	K-3
TP22	K-5
TP23	F-4
TP24	F-4
TP25	D-2
TP26	B-5
TP27	C-6
TP28	G-3
TP29	H-3
TP30	B-7
X1	G-3
X2	G-7



CL-4
-SOLDERING SIDE-



DL-2
-SOLDERING SIDE-

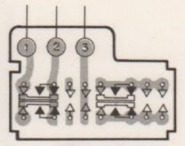


DM-22A -SOLDERING SIDE-

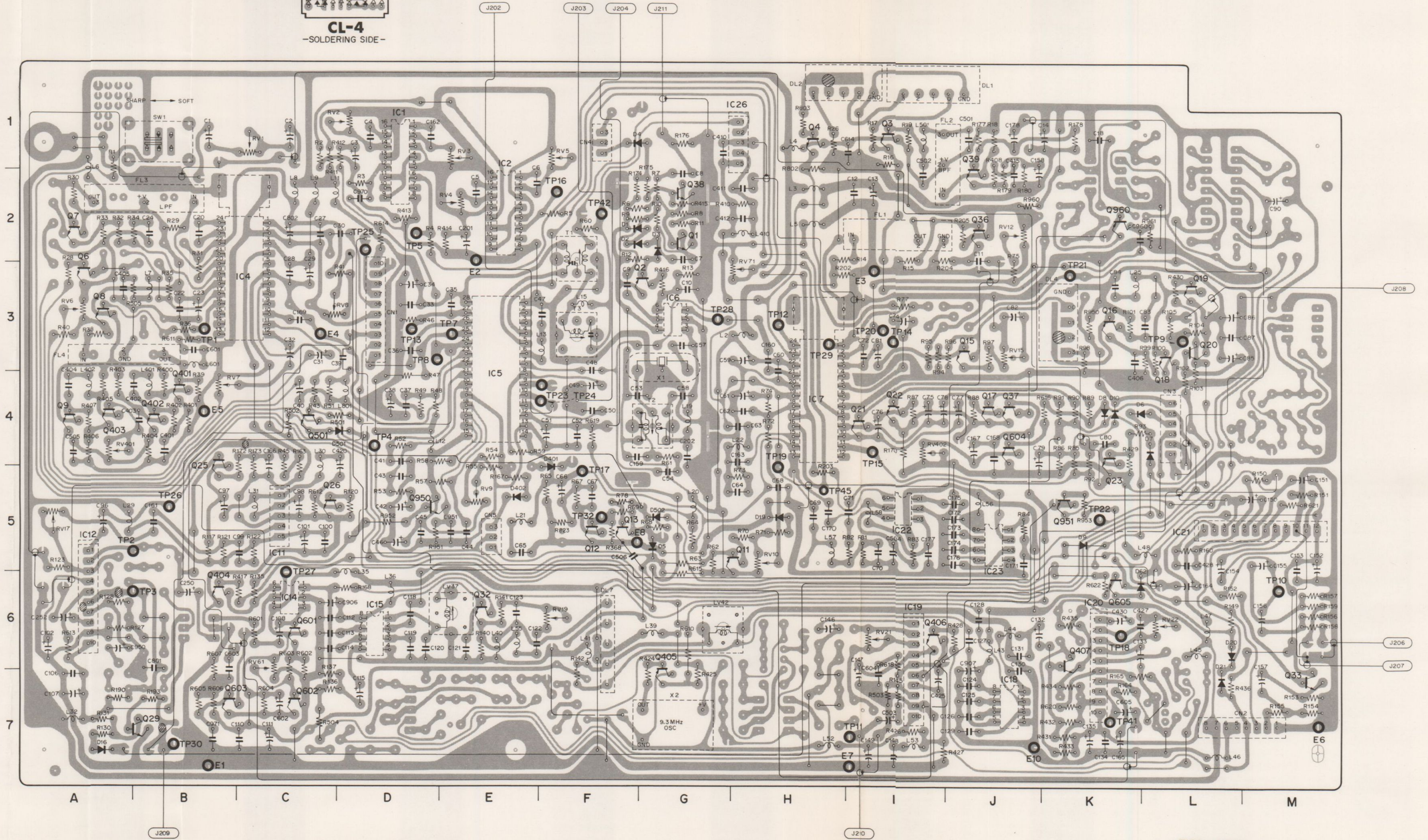
DM-22A (VIDEO DEMODULATOR)
DL-2
CL-4

10181 ~ 11630 (AEP)
10021 ~ 10320 (UK)

CN1	D-3
CN2	M-7
CN3	L-4
CN4	F-1
CN5	E-5
D1	F-2
D2	F-2
D3	G-2
D4	G-1
D5	G-5
D6	L-3
D7	L-4
D8	K-3
D9	K-5
D10	K-3
D11	K-2
D16	A-7
D19	H-5
D20	L-6
D21	L-6
D62	L-6
D401	F-4
D402	E-5
D501	D-4
D502	G-5
DL2	I-1
DL4	K-3
E1	B-7
E2	E-2
E3	I-2
E4	C-3
E5	B-4
E6	M-7
E7	I-7
E8	F-5
E10	J-7
FL1	I-2
FL2	J-1
FL3	A-2
FL4	A-3
IC1	D-1
IC2	E-2
IC4	B-2
IC5	E-3
IC6	G-3
IC7	H-4
IC11	C-5
IC12	A-6
IC14	C-6
IC15	D-6
IC17	H-7
IC18	J-7
IC19	I-7
IC20	K-7
IC21	I-5
IC22	I-5
IC23	J-5
IC26	H-1
LV37	E-6
LV42	G-6
Q1	G-2
Q2	G-3
Q3	I-1
Q4	H-1
Q7	A-2
Q8	A-3
Q9	A-4
Q11	H-6
Q12	F-5
Q13	F-5
Q14	J-3
Q15	J-3
Q16	K-3
Q17	J-4
Q19	L-3
Q20	L-3
Q21	I-4
Q22	I-4
Q23	K-4
Q25	B-4
Q26	D-5
Q29	B-7
Q32	E-6
Q33	M-7
Q36	J-2
Q37	J-4
Q38	G-2
Q39	G-2
Q401	B-4
Q402	B-4
Q403	A-4
Q404	B-6
Q405	G-7
Q406	J-6
Q407	K-6
Q501	C-4
Q601	C-6
Q602	C-7
Q603	C-7
Q604	J-4
Q605	K-6
Q950	E-5
Q951	K-5
Q960	K-2
RV1	C-1
RV2	D-1
RV3	E-1
RV4	E-2
RV5	F-1
RV6	A-3
RV7	C-4
RV8	D-3
RV9	E-5
RV10	H-5
RV12	J-2
RV15	J-3
RV17	A-5
RV19	F-6
RV21	I-6
RV22	L-6
RV61	C-6
RV71	H-3
RV401	A-4
RV402	I-4
S1	B-1
T1	F-3
T2	G-4
T3	F-3
TP1	B-3
TP2	B-5
TP3	B-6
TP4	D-4
TP5	D-2
TP7	E-3
TP8	E-3
TP9	L-3
TP10	M-6
TP11	I-7
TP12	H-3
TP13	D-3
TP14	I-3
TP15	I-4
TP16	F-2
TP17	F-4
TP18	K-6
TP19	H-5
TP20	I-3
TP21	K-3
TP22	K-5
TP23	F-4
TP24	F-4
TP25	D-2
TP26	B-5
TP27	C-6
TP28	G-3
TP29	H-3
TP30	B-7
TP32	F-5
TP41	K-7
TP42	F-2
TP45	H-5
X1	G-4
X2	G-7

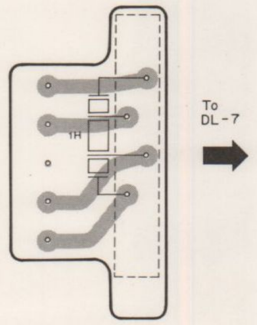


CL-4
-SOLDERING SIDE-



J202
J203
J204
J211
J208
J206
J207
J209
J210
1
2
3
4
5
6
7
A
B
C
D
E
F
G
H
I
J
K
L
M
SHARP
SOFT
SW1
FL3
LPF
IC1
IC2
IC4
IC5
IC6
IC7
IC26
DL2
DL1
9.3 MHz OSC
X1
X2

DM-22A -SOLDERING SIDE-

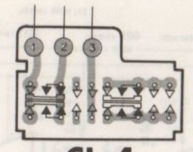


DL-2
-SOLDERING SIDE-

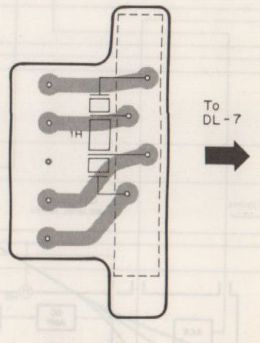
DM-22A (VIDEO DEMODULATOR)
DL-2
CL-4

11631 AND LATER (AEP)
10321 AND LATER (UK)

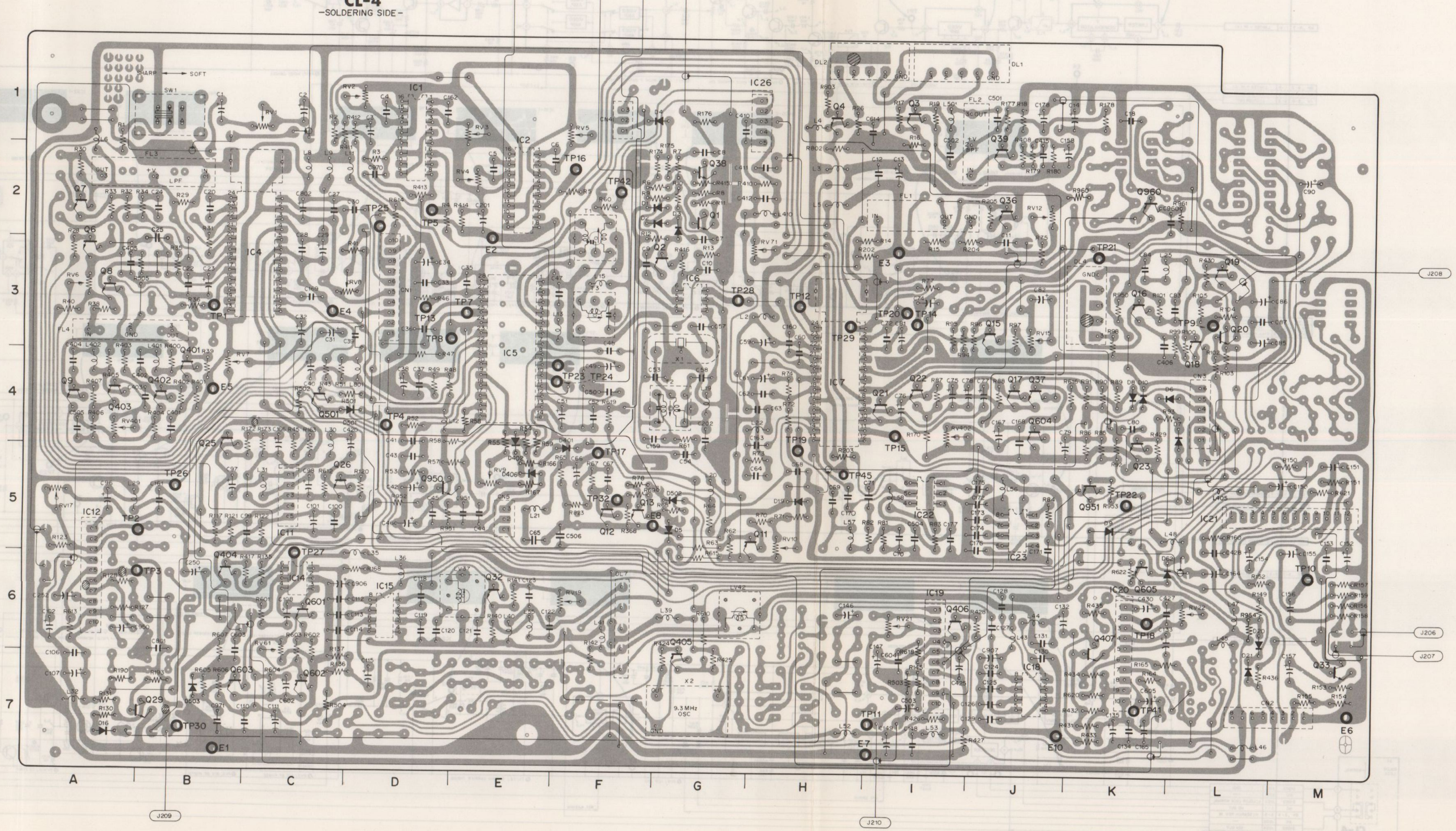
CN1	D-3
CN2	M-7
CN3	L-4
CN4	F-1
CN5	E-5
D1	F-2
D2	F-2
D3	G-2
D4	G-1
D5	G-5
D6	L-3
D7	L-4
D8	K-3
D9	K-5
D10	K-3
D11	K-2
D16	A-7
D19	H-5
D20	L-6
D21	L-6
D62	L-6
D401	F-4
D402	E-5
D406	E-5
D501	D-4
D502	G-5
D503	B-7
DL2	I-1
DL4	K-3
E1	B-7
E2	E-2
E3	I-2
E4	C-3
E5	B-4
E6	M-7
E7	I-7
E8	F-5
E10	J-7
FL1	I-2
FL2	J-1
FL3	A-2
FL4	A-3
IC1	D-1
IC2	E-2
IC4	B-2
IC5	E-3
IC6	G-3
IC7	H-4
IC11	C-5
IC12	A-6
IC14	C-6
IC15	D-6
IC17	H-7
IC18	J-7
IC19	I-7
IC20	K-7
IC21	I-5
IC22	I-5
IC23	J-5
IC26	H-1
LV37	E-6
LV42	G-6
Q1	G-2
Q2	G-3
Q3	I-1
Q4	H-1
Q6	A-3
Q7	A-2
Q8	A-3
Q9	A-4
Q11	H-6
Q12	F-5
Q13	F-5
Q14	J-3
Q15	J-3
Q16	K-3
Q17	J-4
Q19	L-3
Q20	L-3
Q21	I-4
Q22	I-4
Q23	K-4
Q25	B-4
Q26	D-5
Q29	B-7
Q32	E-6
Q33	M-7
Q36	J-2
Q37	J-4
Q38	G-2
Q39	G-2
Q401	B-4
Q402	B-4
Q403	A-4
Q404	B-6
Q405	G-7
Q406	J-6
Q407	K-6
Q501	C-4
Q601	C-6
Q602	C-7
Q603	C-7
Q604	J-4
Q605	K-6
Q950	E-5
Q951	K-5
Q960	K-2
RV1	C-1
RV2	D-1
RV3	E-1
RV4	E-2
RV5	F-1
RV6	A-3
RV7	C-4
RV8	D-3
RV9	E-5
RV10	H-5
RV12	J-2
RV15	J-3
RV17	A-5
RV19	F-6
RV21	I-6
RV22	L-6
RV61	C-6
RV71	H-3
RV401	A-4
RV402	I-4
S1	B-1
T1	F-3
T2	G-4
T3	F-3
TP1	B-3
TP2	B-5
TP3	B-6
TP4	D-4
TP5	D-2
TP7	E-3
TP8	E-3
TP9	L-3
TP10	M-6
TP11	I-7
TP12	H-3
TP13	D-3
TP14	I-3
TP15	I-4
TP16	F-2
TP17	F-4
TP18	K-6
TP19	H-5
TP20	I-3
TP21	K-3
TP22	K-5
TP23	F-4
TP24	F-4
TP25	D-2
TP26	B-5
TP27	C-6
TP28	G-3
TP29	H-3
TP30	B-7
TP32	F-5
TP41	K-7
TP42	F-2
TP45	H-5
X1	G-4
X2	G-7



CL-4
-SOLDERING SIDE-



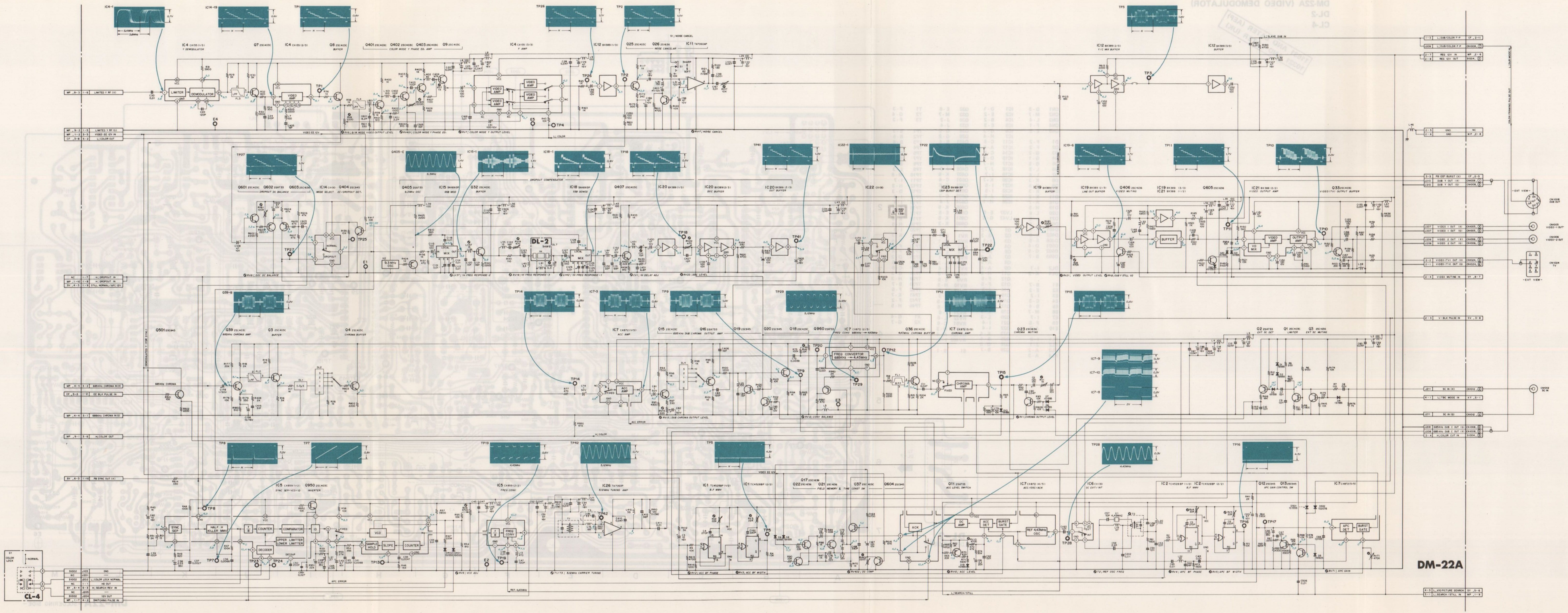
DL-2
-SOLDERING SIDE-



DM-22A -SOLDERING SIDE-

DM-22A
(VIDEO DEMODULATOR)
DL-2
CL-4

UP TO 10180 (AEP)
UP TO 10020 (UK)


LIMITER
DEMODULATOR
VIDEO AMP
DL-2
BUFFER
FREQ CONVERTOR
CHROMA AMP
SYNC SEP
COUNTER
COMPARATOR
DECODER
CL-4
DM-22A

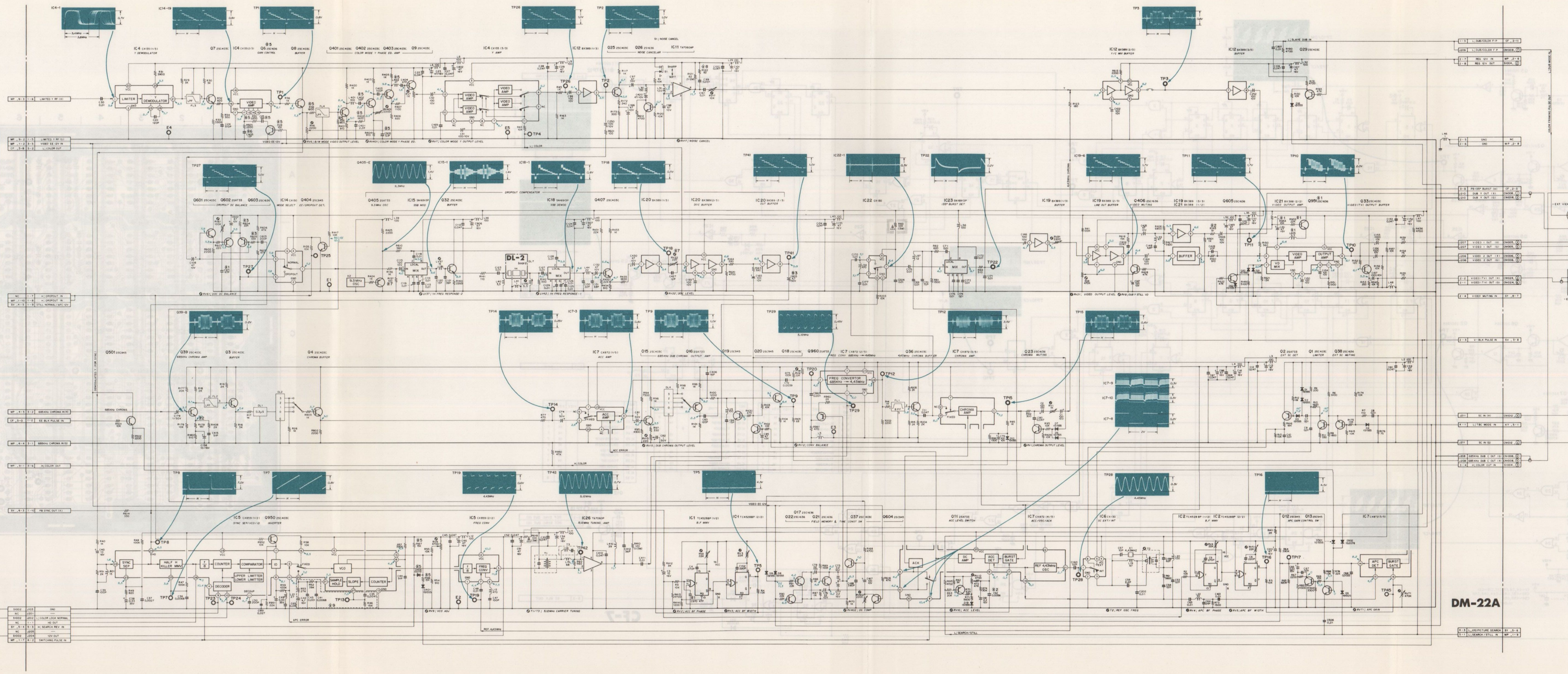
NOTE: **The shaded and ⚠-marked components are critical to safety.**
Replace only with same components as specified.

DM-22A (VIDEO DEMODULATOR)
DL-2
CL-4

10181 AND LATER (AEP)
10021 AND LATER (UK)

NOTE

MARK	CHANGE INFORMATION	SERIAL NO.
※1	C970 47P ADDED C971 47P ADDED Q951 2SC1636 ADDED R953 22K ADDED R954 10K ADDED L405 3.3 ADDED	AEP; 10181 ~ UK; 10021 ~
※2	C62 0.01 ►0.0056 R145 75 ►51 R179 330 ►180	AEP; 10381 ~ UK; 10121 ~
※3	C605 47/16V ►4.7/50V R137 470 ►330 R604 47K ►22K R605 47K ►33K	AEP; 10681 ~ UK; 10221 ~
※4	C122 16P ►18P	AEP; 12081 ~ UK; 10471 ~
※5	C25 18P ADDED C402 110P ►56P C405 15P ►10P C505 15P ►5.1P C601 8.2P DELETED D406 1SS119 ADDED L7 100 DELETED L402 82 ►47 L601 150 DELETED Q6 2SC1636 ADDED R28 10K ADDED R35 2200 ADDED R38 1K ►1800 R39 1K ►1800 R166 15K ADDED R167 220K ►15K R402 1300 ►1800 R611 300 DELETED	AEP; 12531 ~ UK; 10471 ~
※6	C405 10P ►13P	AEP; 14431 ~ UK; 10921 ~
※7	R137 330 ►100 RV22 470 ►220 C122 18P DELETED L55 15 DELETED RV19 470 DELETED	AEP; 14631 ~ UK; 11021 ~
※8	R122 120 ►82	AEP; 17511 ~ UK; 11701 ~
※9	C35 0.0047 DELETED C41 0.0068 DELETED C42 4.7/16V DELETED C43 0.001 DELETED R46 15K DELETED R52 39K DELETED R53 27K DELETED TP13 DELETED	AEP; 17911 ~ UK; 11551 ~


LIMITER
DEMODULATOR
DL-2
CL-4
DM-22A
FREQ CONVERTER
CHROMA AMP
SYNC SEP
HALF H KILLER
COUNTER
COMPARATOR
VCO
DECODER
BUFFER
MIX
VIDEO AMP
OUTPUT AMP
ACC
BURST GATE
REF 4.43MHz OSC
APC DET
EXT VIEW

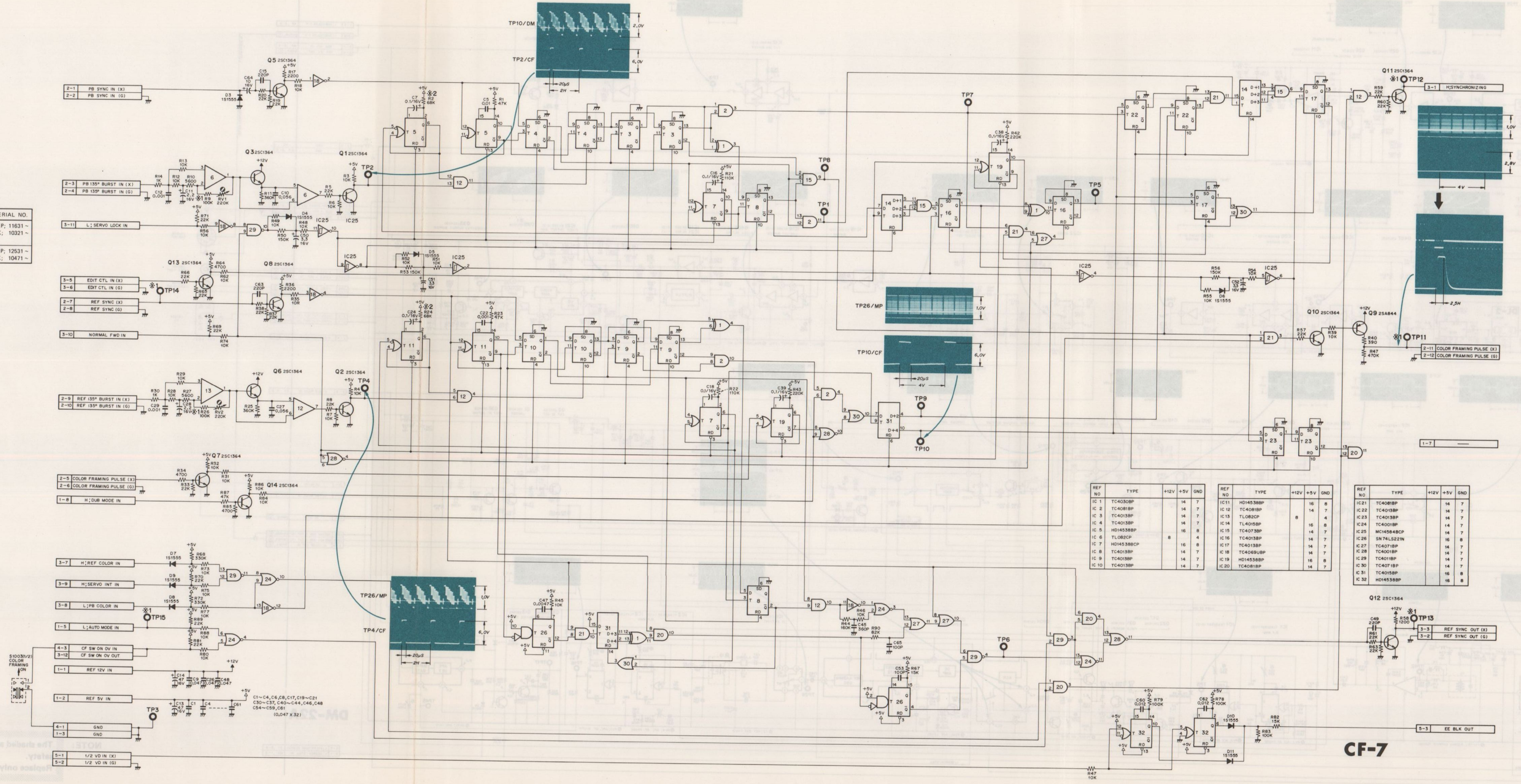
NOTE: The shaded and ⚠ -marked components are critical to safety.
Replace only with same components as specified.

CF-7
(VIDEO COLOR FRAMING)

UP TO 14430 (AEP)
UP TO 10920 (UK)

NOTE

MARK	CHANGE INFORMATION	SERIAL NO.
※1	R9 R26) 22K → 100K TP11 TP15 ADDED	AEP; 11631 ~ UK; 10321 ~
※2	R2 R24) 82K → 68K	AEP; 12531 ~ UK; 10471 ~

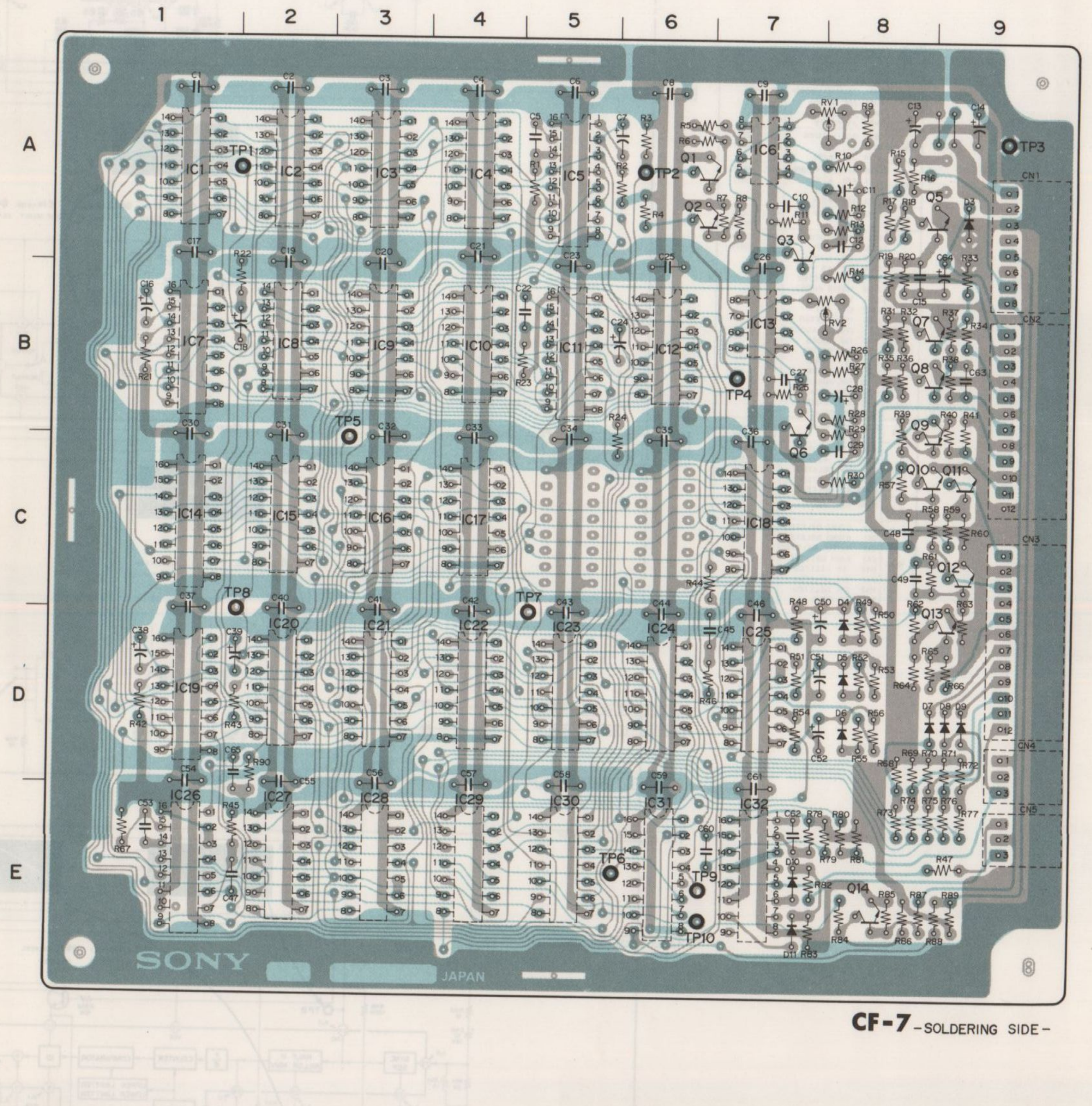

2-1 PB SYNC IN (X)
2-2 PB SYNC IN (G)
2-3 PB 135° BURST IN (X)
2-4 PB 135° BURST IN (G)
3-11 L; SERVO LOCK IN
3-5 EDIT CTL IN (X)
3-6 EDIT CTL IN (G)
2-7 REF SYNC (X)
2-8 REF SYNC (G)
3-10 NORMAL FWD IN
2-9 REF 135° BURST IN (X)
2-10 REF 135° BURST IN (G)
2-5 COLOR FRAMING PULSE (X)
2-6 COLOR FRAMING PULSE (G)
1-8 H; DUB MODE IN
3-7 H; REF COLOR IN
3-9 H; SERVO INT IN
3-8 L; PB COLOR IN
1-5 L; AUTO MODE IN
4-3 CF SW ON 0V IN
3-12 CF SW ON 0V OUT
S1003(1/2) COLOR FRAMING ON
1-1 REF 12V IN
1-2 REF 5V IN
4-1 GND
1-3 GND
5-1 1/2 VD IN (X)
5-2 1/2 VD IN (G)
C1~C4, C6, C8, C17, C19~C21
C30~C37, C40~C44, C46, C48
C54~C59, C61
(0.047 X 32)
Q1 2SC1364
Q2 2SC1364
Q3 2SC1364
Q5 2SC1364
Q6 2SC1364
Q7 2SC1364
Q8 2SC1364
Q9 2SA844
Q10 2SC1364
Q11 2SC1364
Q12 2SC1364
Q13 2SC1364
Q14 2SC1364
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
TP10
TP11
TP12
TP13
TP14
TP15
TP10/DM
TP2/CF
TP26/MP
TP10/CF
TP4/CF
1.0V
2.8V
4V
2.5H
3-1 H;SYNCHRONIZING
2-11 COLOR FRAMING PULSE (X)
2-12 COLOR FRAMING PULSE (G)
1-7
3-3 REF SYNC OUT (X)
3-2 REF SYNC OUT (G)
5-3 EE BLK OUT

REF NO	TYPE	+12V	+5V	GND
IC 1	TC4030BP		14	7
IC 2	TC4081BP		14	7
IC 3	TC4013BP		14	7
IC 4	TC4013BP		14	7
IC 5	HD14538BP		16	8
IC 6	TL082CP	8		4
IC 7	HD14538BCP		16	8
IC 8	TC4013BP		14	7
IC 9	TC4013BP		14	7
IC 10	TC4013BP		14	7

REF NO	TYPE	+12V	+5V	GND
IC11	HD14538BP		16	8
IC 12	TC4081BP		14	7
IC 13	TL082CP	8		4
IC 14	TL4015BP		16	8
IC 15	TC4073BP		14	7
IC 16	TC4013BP		14	7
IC 17	TC4013BP		14	7
IC 18	TC4069UBP		14	7
IC 19	HD14538BP		16	8
IC 20	TC4081BP		14	7

REF NO	TYPE	+12V	+5V	GND
IC21	TC4081BP		14	7
IC 22	TC4013BP		14	7
IC 23	TC4013BP		14	7
IC 24	TC4001BP		14	7
IC 25	MC14584BCP		14	7
IC 26	SN74LS221N		16	8
IC 27	TC4071BP		14	7
IC 28	TC4001BP		14	7
IC 29	TC4011BP		14	7
IC 30	TC4071BP		14	7
IC 31	TC4015BP		16	8
IC 32	HD14538BP		16	8

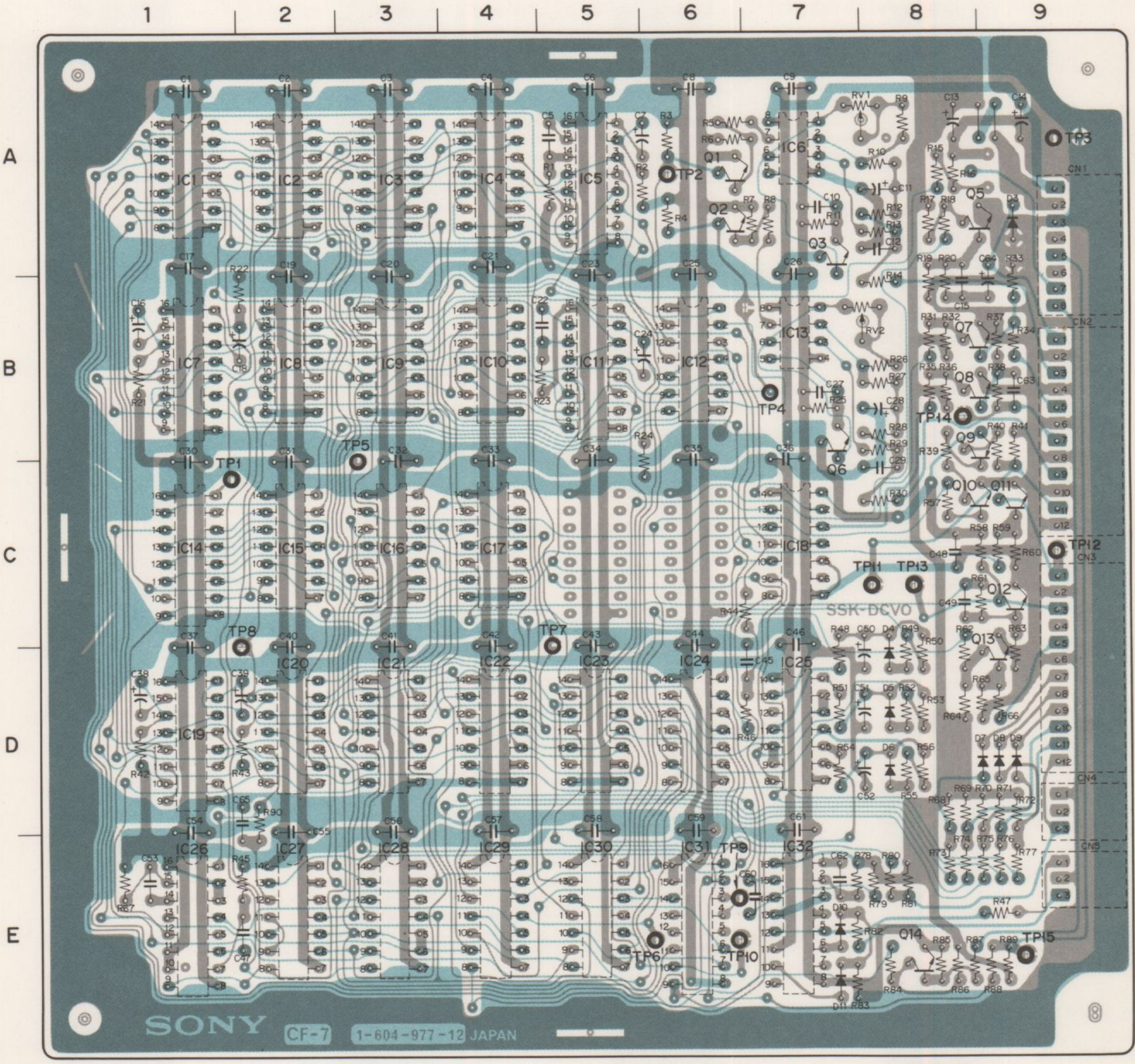
CF-7


1
2
3
4
5
6
7
8
9
A
B
C
D
E
SONY
JAPAN

CF-7 -SOLDERING SIDE-

CF-7 (VIDEO COLOR FRAMING)

10381 AND LATER (AEP)
10121 AND LATER (UK)

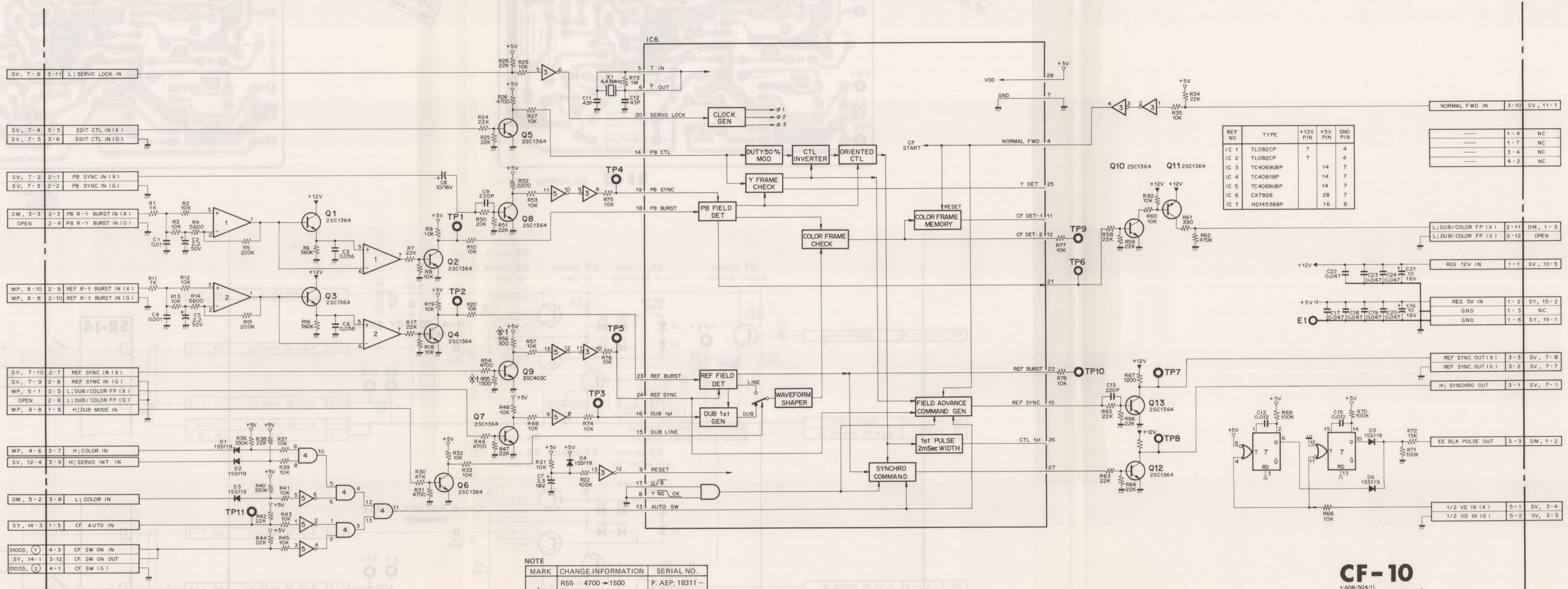


CF-7 -SOLDERING SIDE-

CN1	A-9
CN2	B-9
CN3	C-9
CN4	D-9
CN5	E-9
D3	A-9
D4	D-8
D5	D-8
D6	D-8
D7	D-9
D8	D-9
D9	D-9
D10	E-7
D11	E-7
IC1	A-1
IC2	A-2
IC3	A-3
IC4	A-4
IC5	A-5
IC6	A-7
IC7	B-1
IC8	B-2
IC9	B-3
IC10	B-4
IC11	B-5
IC12	B-6
IC13	B-7
IC14	C-1
IC15	C-2
IC16	C-3
IC17	C-4
IC18	C-7
IC19	D-1
IC20	D-2
IC21	D-3
IC22	D-4
IC23	D-5
IC24	D-6
IC25	D-7
IC26	E-1
IC27	E-2
IC28	E-3
IC29	E-4
IC30	E-5
IC31	E-6
IC32	E-7
Q1	A-6
Q2	A-6
Q3	A-7
Q5	A-8
Q6	B-7
Q7	B-8
Q8	B-8
Q9	B-8
Q10	C-8
Q11	C-9
Q12	C-9
Q13	C-9
Q14	E-8
RV1	A-7
RV2	B-7
TP1	C-1
TP2	A-6
TP3	A-9
TP4	B-7
TP5	B-3
TP6	E-6
TP7	C-5
TP8	C-2
TP9	E-6
TP10	E-6
TP11	C-8
TP12	C-9
TP13	C-8
TP14	B-8
TP15	E-9

CF-10
(COLOR FRAMING)

14431 AND LATER (AEP)
10921 AND LATER (UK)


SV, 7-6 3-11 L; SERVO LOCK IN
SV, 7-4 3-5 EDIT CTL IN (X)
SV, 7-5 3-6 EDIT CTL IN (G)
SV, 7-2 2-1 PB SYNC IN (X)
SV, 7-3 2-2 PB SYNC IN (G)
DM, 5-3 2-3 PB R-Y BURST IN (X)
OPEN 2-4 PB R-Y BURST IN (G)
MP, 8-10 2-9 REF R-Y BURST IN (X)
MP, 8-8 2-10 REF R-Y BURST IN (G)
SV, 7-10 2-7 REF SYNC IN (X)
SV, 7-9 2-8 REF SYNC IN (G)
MP, 5-1 2-5 L; DUB/COLOR FP (X)
OPEN 2-6 L; DUB/COLOR FP (G)
MP, 8-8 1-8 H; DUB MODE IN
MP, 4-6 3-7 H; COLOR IN
SV, 12-4 3-9 H; SERVO INT IN
DM, 5-2 3-8 L; COLOR IN
SY, 14-3 1-5 CF AUTO IN
S1003 4-3 CF SW ON IN
SY, 14-1 3-12 CF SW ON OUT
S1003 4-1 CF SW (G)
IC6
CLOCK GEN
DUTY50% MOD
CTL INVERTER
ORIENTED CTL
Y FRAME CHECK
PB FIELD DET
COLOR FRAME CHECK
COLOR FRAME MEMORY
REF FIELD DET
WAVEFORM SHAPER
DUB 1st GEN
FIELD ADVANCE COMMAND GEN
1st PULSE 2mSec WIDTH
SYNCHRO COMMAND
SERVO LOCK
PB CTL
PB SYNC
PB BURST
REF BURST
REF SYNC
DUB 1st
DUB LINE
RESET
AUTO SW
NORMAL FWD
Y DET
CF DET-1
CF DET-2
CTL 1st
CF START
VDD
GND
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
TP10
TP11
E1
NORMAL FWD IN 3-10 SV, 11-1
1-4 NC
1-7 NC
3-4 NC
4-2 NC
L; DUB/COLOR FP (X) 2-11 DM, 1-3
L; DUB/COLOR FP (G) 2-12 OPEN
REG 12V IN 1-1 SV, 10-5
REG 5V IN 1-2 SY, 15-2
GND 1-3 NC
GND 1-6 SY, 15-1
REF SYNC OUT (X) 3-3 SV, 7-8
REF SYNC OUT (G) 3-2 SV, 7-7
H; SYNCHRO OUT 3-1 SV, 7-1
EE BLK PULSE OUT 5-3 DM, 1-2
1/2 VD IN (X) 5-1 SV, 3-4
1/2 VD IN (G) 5-2 SV, 3-5

REF NO	TYPE	+12V PIN	+5V PIN	GND PIN
IC 1	TL082CP	7		4
IC 2	TL082CP	7		4
IC 3	TC4069UBP		14	7
IC 4	TC4081BP		14	7
IC 5	TC4069UBP		14	7
IC 6	CX7928		28	7
IC 7	HD14538BP		16	8

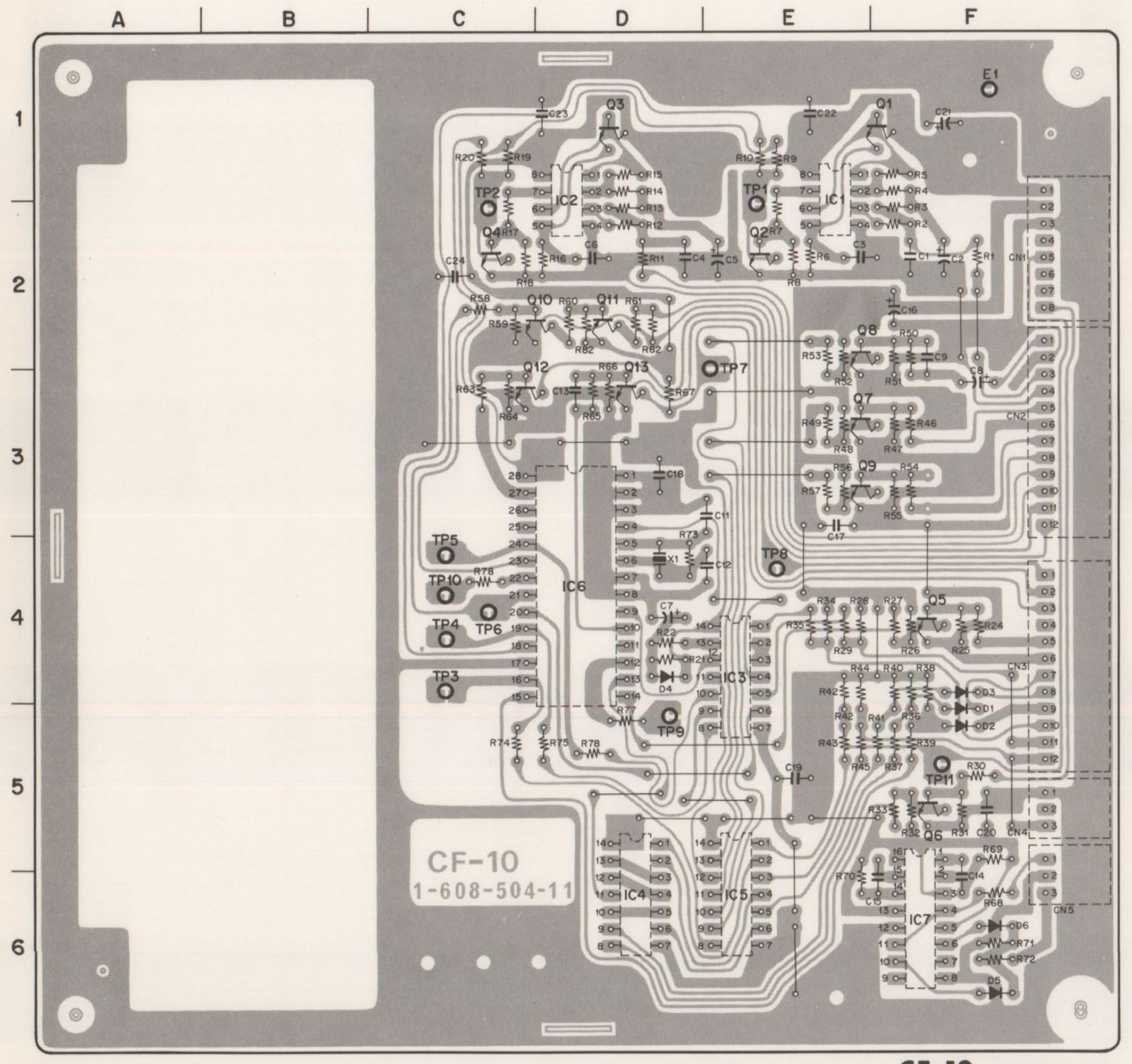
NOTE

MARK	CHANGE INFORMATION	SERIAL NO.
※1	R55 4700 → 1500 R56 2200 → 300	P. AEP; 18311 ~ P. UK; 11701 ~ S. AEP; 10471 ~

CF-10
1-608-504-11
VO-5850P (S/N14431~(AEP)
S/N10921~(UK))
VO-5850S (S/N10151~)

CF-10
(COLOR FRAMING)

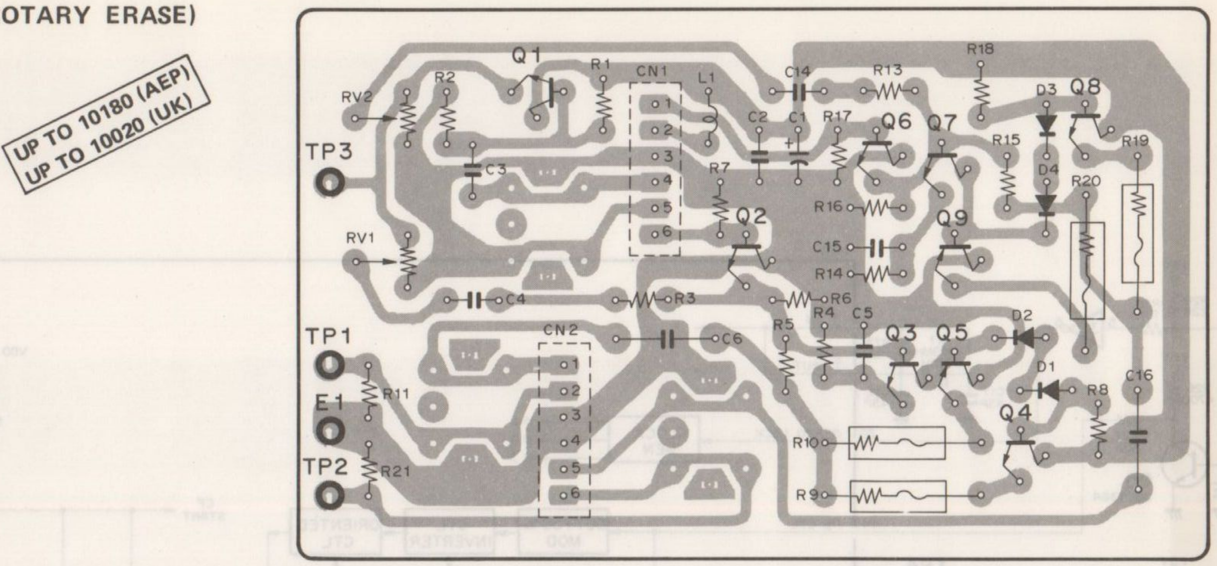
14431 AND LATER (AEP)
10921 AND LATER (UK)


A
B
C
D
E
F
1
2
3
4
5
6
CF-10
1-608-504-11
IC6
IC7
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
TP10
E1

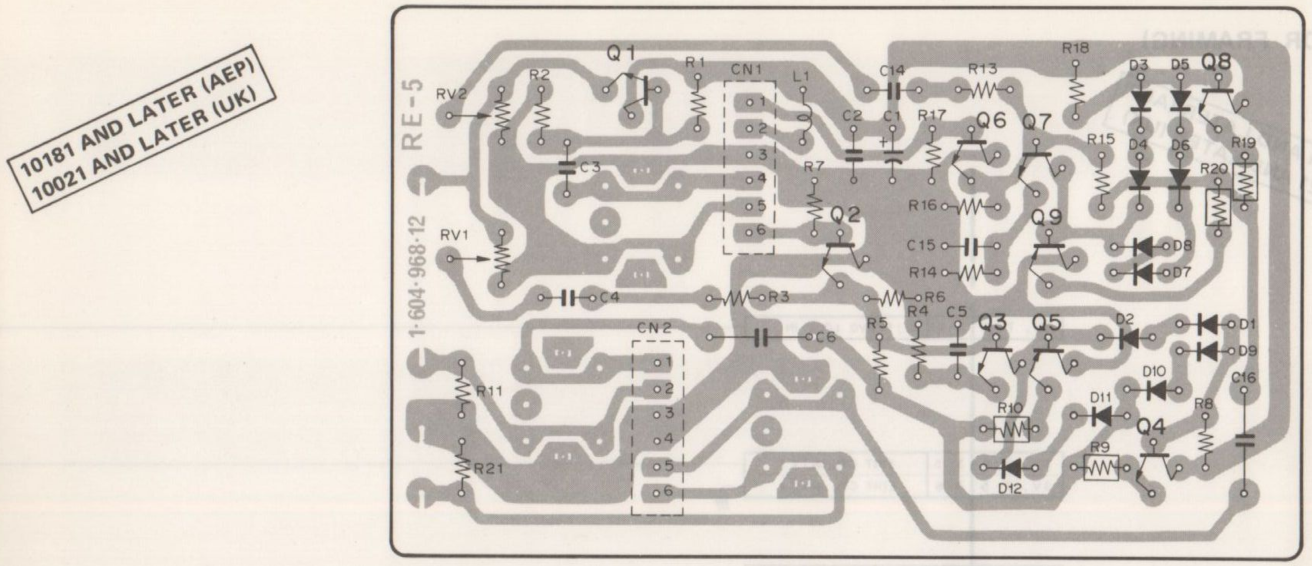
CF-10 -SOLDERING SIDE-
1-608-504-11
VO-5850P (S/N14431~(AEP)
S/N10921~(UK))
VO-5850S (S/N10151~)

CN1	F-2	E1	F-1	Q1	F-1	TP1	E-1
CN2	F-3			Q2	E-2	TP2	C-2
CN3	F-4	IC1	F-1	Q3	D-1	TP3	C-4
CN4	F-5	IC2	D-1	Q4	C-2	TP4	C-4
CN5	F-6	IC3	E-4	Q5	F-4	TP5	C-4
		IC4	D-6	Q6	F-5	TP6	C-4
D1	F-4	IC5	E-6	Q7	E-3	TP7	E-2
D2	F-5	IC6	D-4	Q8	E-3	TP8	E-4
D3	F-4	IC7	F-6	Q9	E-3	TP9	D-5
D4	D-4			Q10	C-2	TP10	C-4
D5	F-6			Q11	D-2	TP11	F-5
D6	F-6			Q12	C-3		
				Q13	D-3	X1	D-4

RE-5 (ROTARY ERASE)

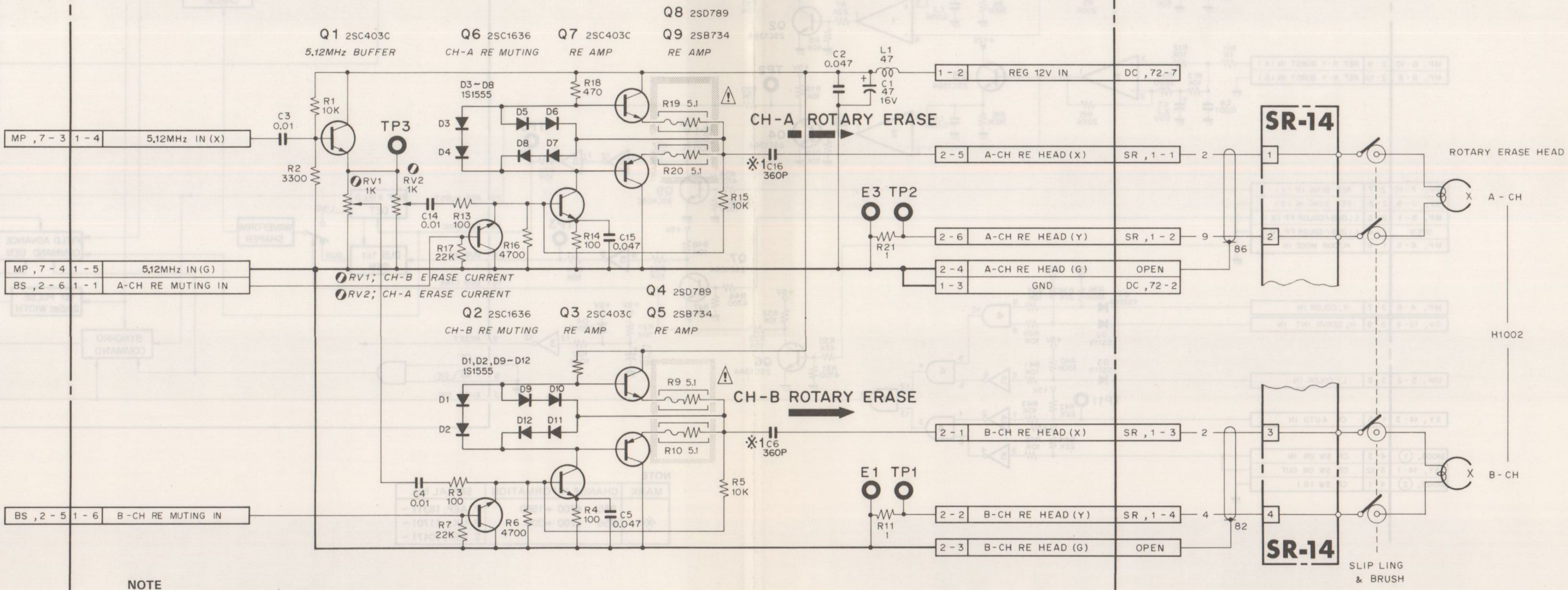

UP TO 10180 (AEP)
UP TO 10020 (UK)
RV2
R2
Q1
R1
CN1
L1
C14
R13
R18
D3
Q8
TP3
C3
C2
C1
R17
Q6
Q7
R15
R19
D4
R20
R7
R16
Q2
Q9
RV1
C15
R14
C4
R3
R6
TP1
CN2
C6
R5
R4
C5
Q3
Q5
D2
E1
R11
D1
R8
C16
TP2
R21
R10
Q4
R9

RE-5 -SOLDERING SIDE-


10181 AND LATER (AEP)
10021 AND LATER (UK)
RE-5
1-604-968-12
RV2
R2
Q1
R1
CN1
L1
C14
R13
R18
D3
D5
Q8
C2
C1
R17
Q6
Q7
R15
D4
D6
R19
C3
R7
R20
R16
Q2
Q9
RV1
C15
D8
R14
D7
C4
R3
R6
CN2
C6
R5
R4
C5
Q3
Q5
D2
D1
D9
D10
C16
R11
D11
R10
R8
Q4
R9
R21
D12

RE-5 -SOLDERING SIDE-

1-604-968-12
VO-5850
VO-5850P
VO-5850S


Q1 2SC403C
5.12MHz BUFFER
Q6 2SC1636
CH-A RE MUTING
Q7 2SC403C
RE AMP
Q8 2SD789
Q9 2SB734
RE AMP
D3-D8
1S1555
R18
470
R19 5.1
R20 5.1
CH-A ROTARY ERASE
※1 C16
360P
R15
10K
C2
0.047
L1
47
C1
47
16V
1-2 REG 12V IN DC ,72-7
MP ,7-3 1-4 5.12MHz IN (X)
C3
0.01
R1
10K
TP3
R2
3300
RV1
1K
RV2
1K
C14
0.01
R13
100
R14
100
C15
0.047
R16
4700
R17
22K
E3 TP2
R21
1
2-5 A-CH RE HEAD (X) SR ,1-1
2-6 A-CH RE HEAD (Y) SR ,1-2
2-4 A-CH RE HEAD (G) OPEN
1-3 GND DC ,72-2
MP ,7-4 1-5 5.12MHz IN (G)
BS ,2-6 1-1 A-CH RE MUTING IN
RV1; CH-B ERASE CURRENT
RV2; CH-A ERASE CURRENT
Q4 2SD789
Q2 2SC1636
CH-B RE MUTING
Q3 2SC403C
RE AMP
Q5 2SB734
RE AMP
D1,D2,D9-D12
1S1555
R9 5.1
R10 5.1
CH-B ROTARY ERASE
※1 C6
360P
R5
10K
C4
0.01
R3
100
R4
100
C5
0.047
R6
4700
R7
22K
E1 TP1
R11
1
2-1 B-CH RE HEAD (X) SR ,1-3
2-2 B-CH RE HEAD (Y) SR ,1-4
2-3 B-CH RE HEAD (G) OPEN
BS ,2-5 1-6 B-CH RE MUTING IN
SR-14
ROTARY ERASE HEAD
A-CH
B-CH
H1002
86
82
SLIP LING
& BRUSH

RE-5

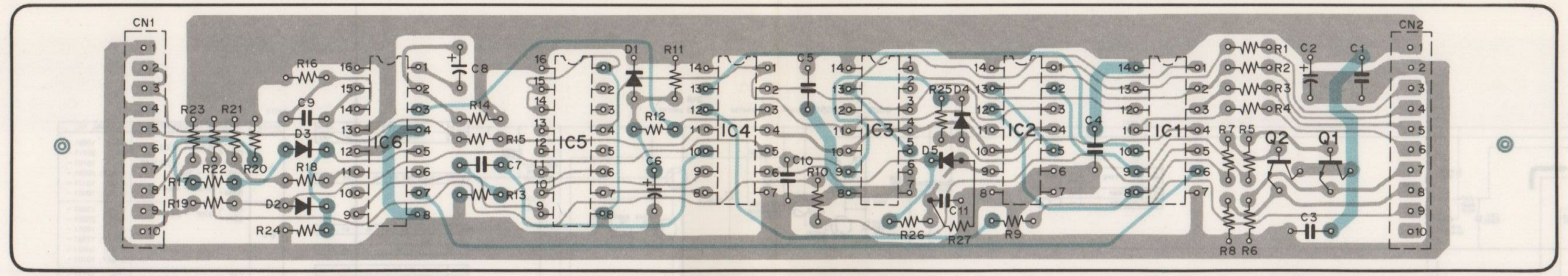
NOTE

MARK	CHANGE INFORMATION	SERIAL NO.
※1	C6 C16) 430P → 360P	P. AEP; 14631 ~ P. UK; 11021 ~ S. AEP; 10201 ~

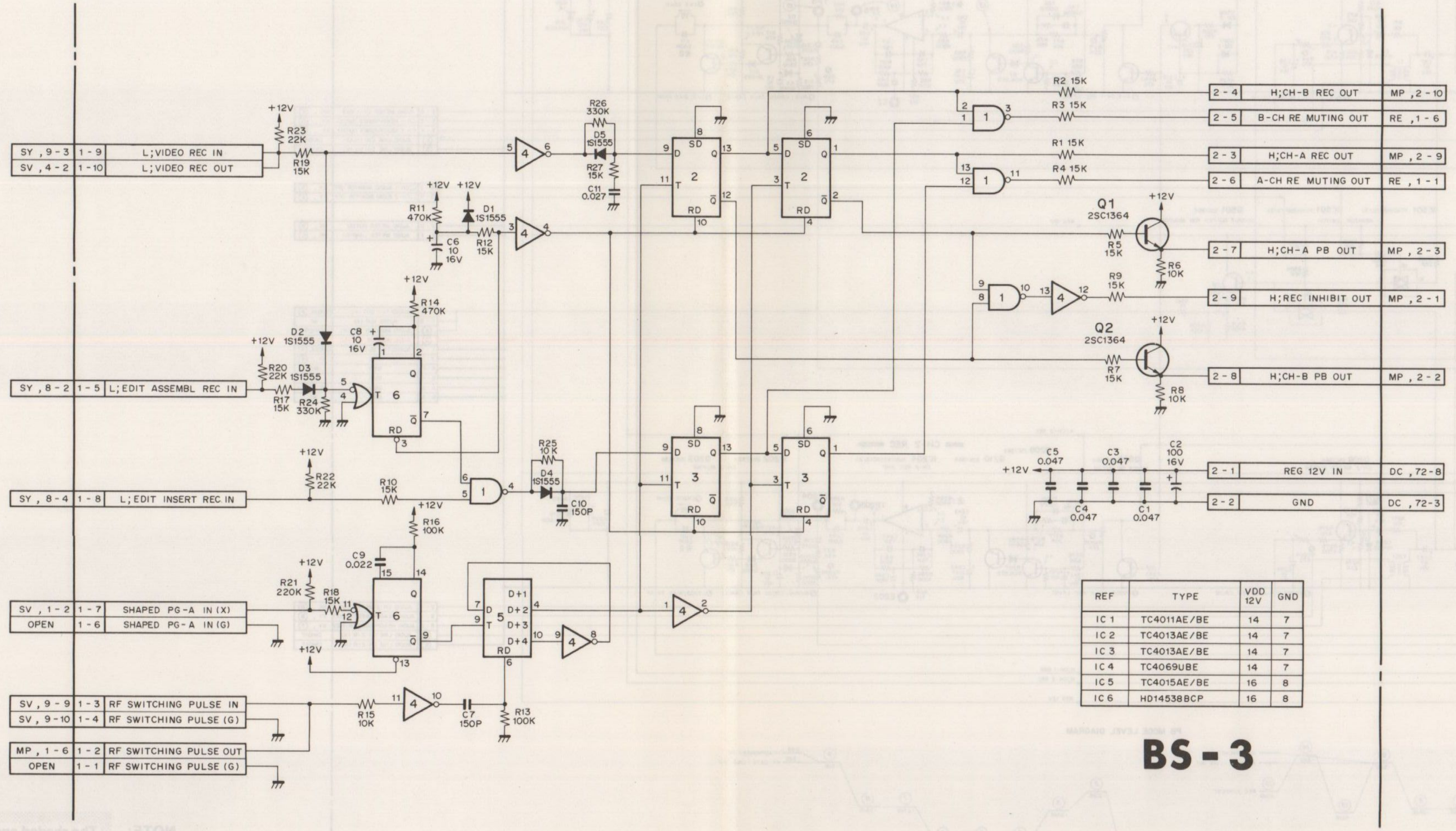
NOTE: **The shaded and ⚠-marked components are critical to safety. Replace only with same components as specified.**

BS-3 (BLANKING SW)

UP TO 11630 (AEP)
UP TO 10320 (UK)


CN1
CN2
IC1
IC2
IC3
IC4
IC5
IC6
Q1
Q2

BS-3 -SOLDERING SIDE-

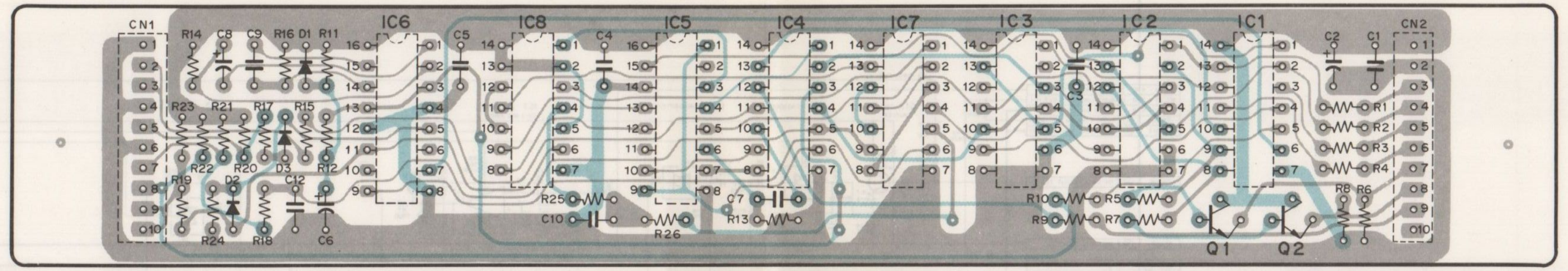

SY, 9-3 | 1-9 | L;VIDEO REC IN
SV, 4-2 | 1-10 | L;VIDEO REC OUT
SY, 8-2 | 1-5 | L;EDIT ASSEMBL REC IN
SY, 8-4 | 1-8 | L;EDIT INSERT REC IN
SV, 1-2 | 1-7 | SHAPED PG-A IN (X)
OPEN | 1-6 | SHAPED PG-A IN (G)
SV, 9-9 | 1-3 | RF SWITCHING PULSE IN
SV, 9-10 | 1-4 | RF SWITCHING PULSE (G)
MP, 1-6 | 1-2 | RF SWITCHING PULSE OUT
OPEN | 1-1 | RF SWITCHING PULSE (G)
2-4 | H;CH-B REC OUT | MP, 2-10
2-5 | B-CH RE MUTING OUT | RE, 1-6
2-3 | H;CH-A REC OUT | MP, 2-9
2-6 | A-CH RE MUTING OUT | RE, 1-1
2-7 | H;CH-A PB OUT | MP, 2-3
2-9 | H;REC INHIBIT OUT | MP, 2-1
2-8 | H;CH-B PB OUT | MP, 2-2
2-1 | REG 12V IN | DC, 72-8
2-2 | GND | DC, 72-3
+12V
R23 22K
R19 15K
D2 1S1555
R20 22K
D3 1S1555
R17 15K
R24 330K
R22 22K
R21 220K
R18 15K
Q1 2SC1364
Q2 2SC1364
R6 10K
R8 10K
C2 100 16V
C1 0.047
C4 0.047

REF	TYPE	VDD 12V	GND
IC 1	TC4011AE/BE	14	7
IC 2	TC4013AE/BE	14	7
IC 3	TC4013AE/BE	14	7
IC 4	TC4069UBE	14	7
IC 5	TC4015AE/BE	16	8
IC 6	HD14538BCP	16	8

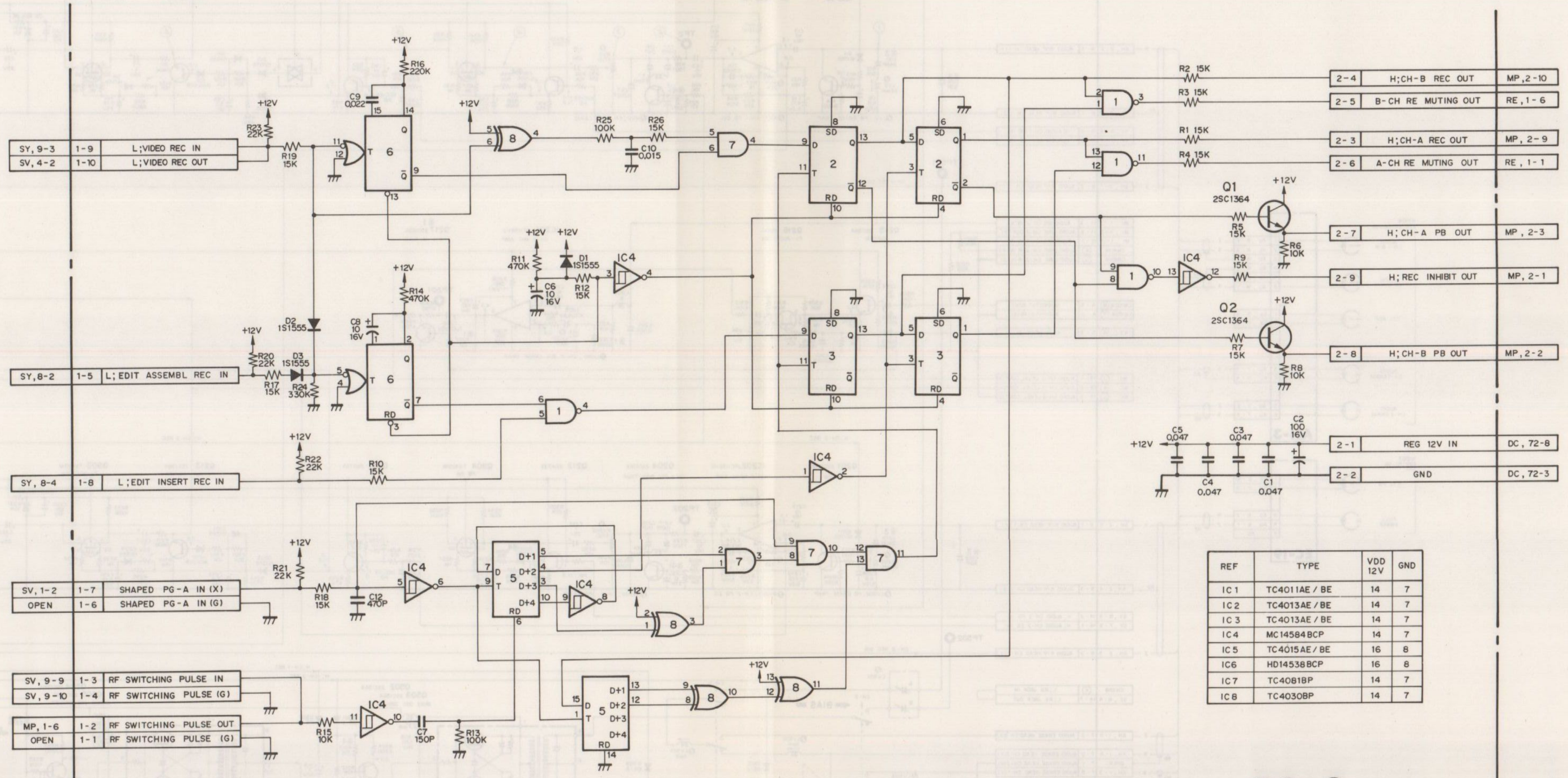
BS-3

BS-3 (BLANKING SW)

11631 AND LATER (AEP)
10321 AND LATER (UK)


CN1
CN2
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
Q1
Q2

BS-3 -SOLDERING SIDE-

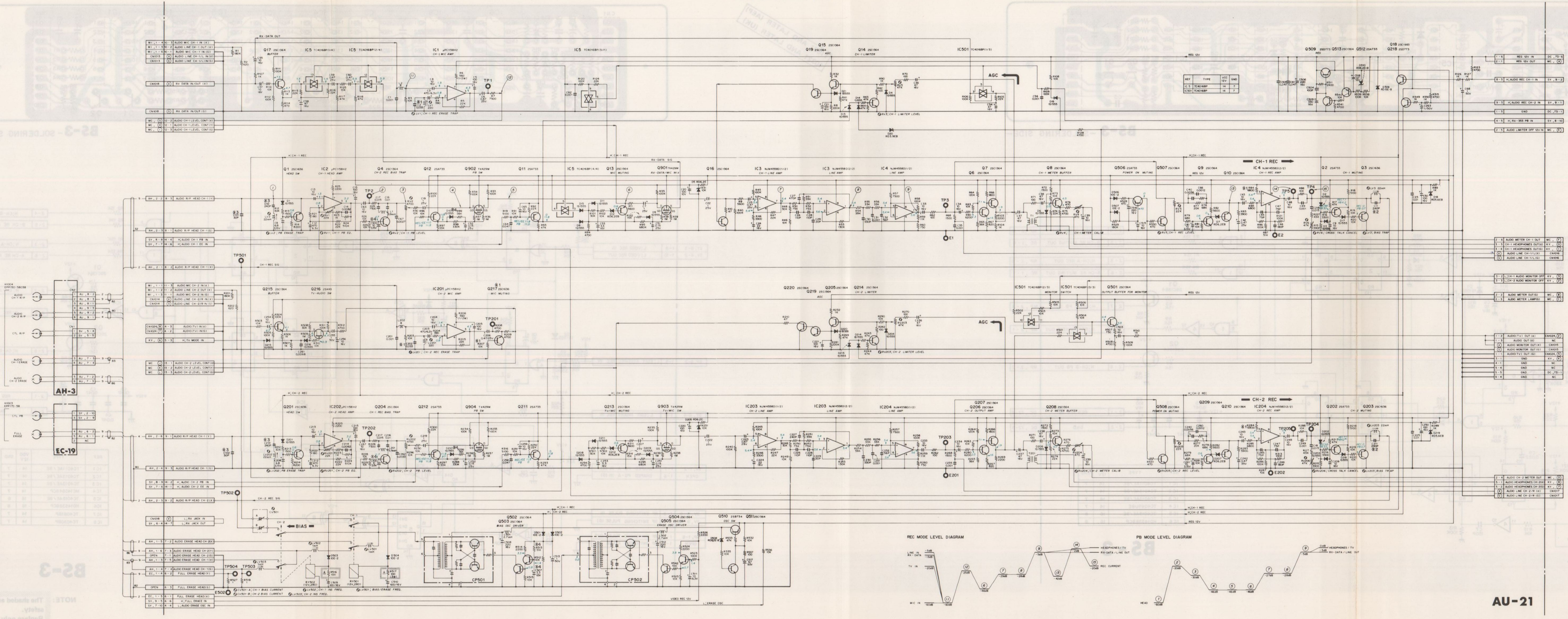

SY, 9-3 | 1-9 | L;VIDEO REC IN
SV, 4-2 | 1-10 | L;VIDEO REC OUT
SY, 8-2 | 1-5 | L;EDIT ASSEMBL REC IN
SY, 8-4 | 1-8 | L;EDIT INSERT REC IN
SV, 1-2 | 1-7 | SHAPED PG-A IN (X)
OPEN | 1-6 | SHAPED PG-A IN (G)
SV, 9-9 | 1-3 | RF SWITCHING PULSE IN
SV, 9-10 | 1-4 | RF SWITCHING PULSE (G)
MP, 1-6 | 1-2 | RF SWITCHING PULSE OUT
OPEN | 1-1 | RF SWITCHING PULSE (G)
2-4 | H;CH-B REC OUT | MP, 2-10
2-5 | B-CH RE MUTING OUT | RE, 1-6
2-3 | H;CH-A REC OUT | MP, 2-9
2-6 | A-CH RE MUTING OUT | RE, 1-1
2-7 | H;CH-A PB OUT | MP, 2-3
2-9 | H;REC INHIBIT OUT | MP, 2-1
2-8 | H;CH-B PB OUT | MP, 2-2
2-1 | REG 12V IN | DC, 72-8
2-2 | GND | DC, 72-3
+12V
R23 22K
R19 15K
D2 1S1555
R20 22K
D3 1S1555
R17 15K
R24 330K
R22 22K
R21 22K
R6 10K
R8 10K
C2 100 16V
C1 0.047
C4 0.047

REF	TYPE	VDD 12V	GND
IC1	TC4011AE / BE	14	7
IC2	TC4013AE / BE	14	7
IC3	TC4013AE / BE	14	7
IC4	MC14584BCP	14	7
IC5	TC4015AE / BE	16	8
IC6	HD14538BCP	16	8
IC7	TC4081BP	14	7
IC8	TC4030BP	14	7

BS-3

NOTE: **The shaded and ⚠ -marked components are critical to safety.**
Replace only with same components as specified.

AU-21 (AUDIO REC/PB AMP)


AH-3
EC-19
CH-1 REC
CH-2 REC
AGC
AGC
BIAS
CP501
CP502
TP501
TP502
TP503
TP504
REC MODE LEVEL DIAGRAM
PB MODE LEVEL DIAGRAM

NOTE

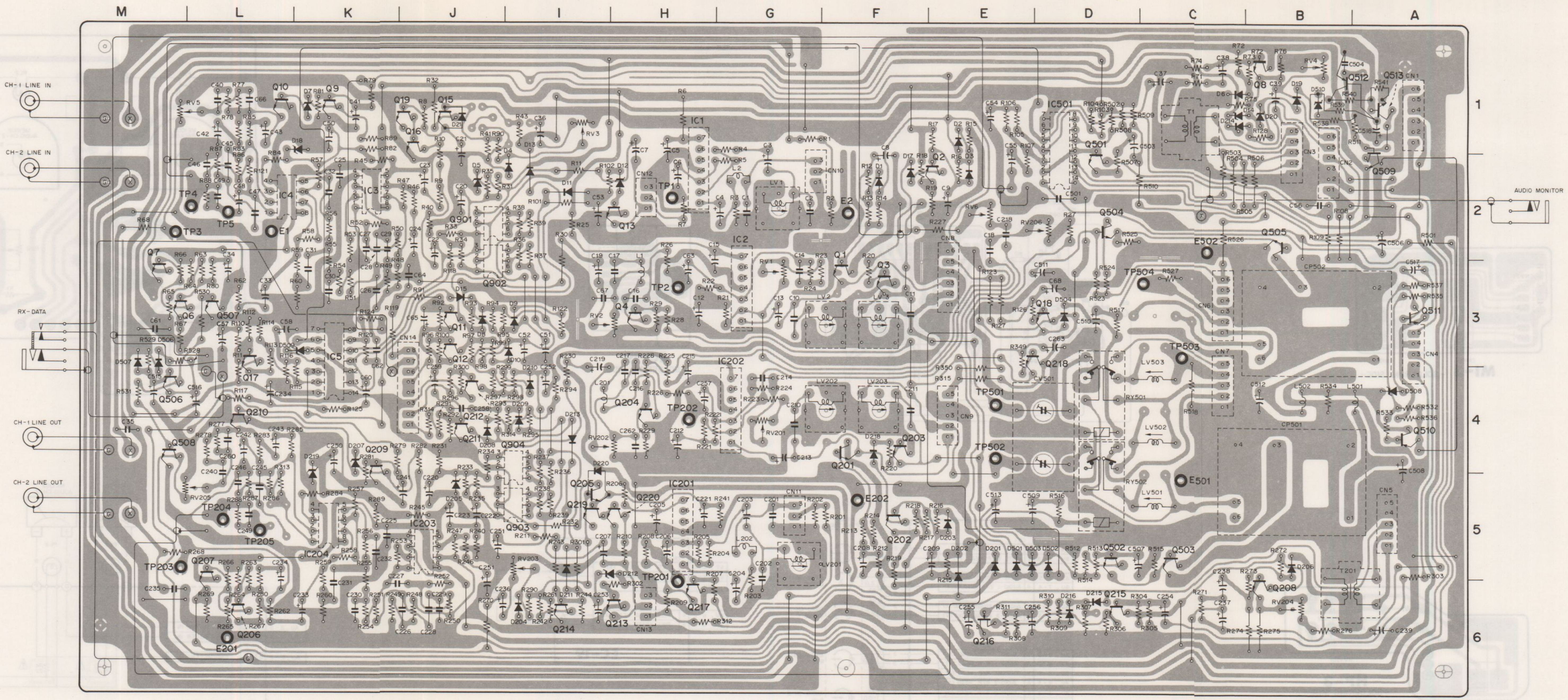
MARK	CHANGE INFORMATION	SERIAL NO.
※1	C2, C202 0.068 → 0.033 Q217 2SC1815 → 2SC1636 R207 1K → 10K R84, R284 100K → 6800	USA; 10891 ~ CND; 20111 ~ J; 10101 ~ P. AEP; 10381 ~ P. UK; 10121 ~ S. AEP; 10051 ~
※2	C11, C211 270P → 240P	USA; 13891 ~ CND; 20261 ~ J; 10551 ~ P. AEP; 12981 ~ P. UK; 10621 ~ S. AEP; 10101 ~
※3	C10, C210 270P → 240P C101, C102 30P ADDED	USA; 14741 ~ CND; 20311 ~ J; 10651 ~ P. AEP; 12981 ~ P. UK; 10621 ~ S. AEP; 10101 ~
※4	C301, C302 10/20V ADDED C507 10/20V → 3.3/25V R99, R299 130K → 56K R513 33K → 51K	USA; 17511 ~ CND; 20661 ~ J; 11301 ~ P. AEP; 15231 ~ P. UK; 11101 ~ S. AEP; 10251 ~ PM; 10031 ~

AU-21

NOTE: **The shaded and ⚠-marked components are critical to safety.
Replace only with same components as specified.**

AU-21 (AUDIO REC/PB AMP)

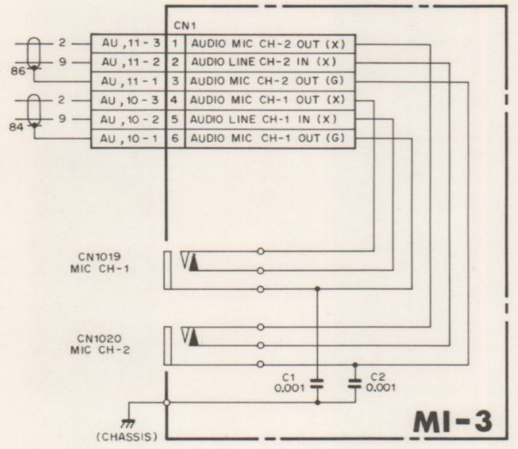
UP TO 10180 (AEP)

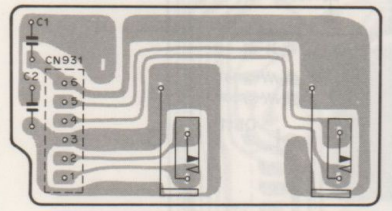

M
L
K
J
I
H
G
F
E
D
C
B
A
1
2
3
4
5
6
CH-1 LINE IN
CH-2 LINE IN
RX-DATA
CH-1 LINE OUT
CH-2 LINE OUT
AUDIO MONITOR
TP3
TP4
TP5
E1
TP2
TP1
E2
TP202
TP204
TP205
TP203
E201
TP201
E202
TP501
TP502
TP503
TP504
E501
E502
IC1
IC2
IC3
IC4
IC5
IC201
IC202
IC203
IC204
IC501

AU-21 -SOLDERING SIDE-

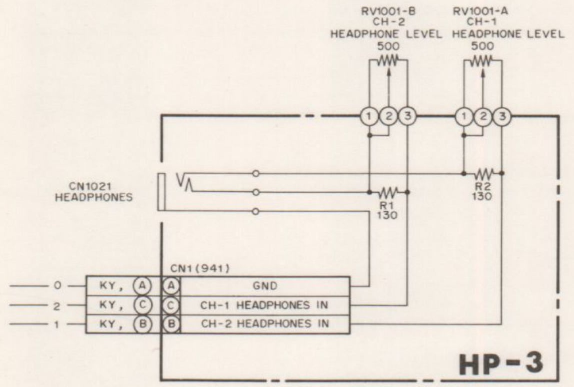
CN1	A - 1
CN2	B - 1
CN3	B - 1
CN4	A - 3
CN5	A - 5
CN6	C - 3
CN7	C - 4
CN8	E - 3
CN9	E - 4
CN10	G - 2
CN11	G - 5
CN12	H - 2
CN13	H - 6
CN14	J - 4
CP501	B - 5
CP502	B - 3
CV501	D - 4
D1	F - 2
D2	E - 1
D3	E - 2
D4	I - 2
D5	J - 2
D6	C - 1
D7	K - 1
D8	J - 3
D9	I - 3
D10	I - 3
D11	I - 2
D12	H - 2
D13	I - 2
D14	C - 1
D15	J - 3
D17	F - 2
D18	K - 2
D19	B - 1
D20	B - 1
D21	J - 1
D201	E - 5
D202	E - 5
D203	E - 5
D204	I - 6
D205	J - 5
D206	B - 5
D207	K - 4
D208	J - 4
D209	I - 4
D210	I - 4
D211	I - 5
D212	I - 5
D213	I - 4
D214	C - 1
D215	D - 6
D216	D - 6
D218	F - 4
D219	K - 4
D220	I - 4
D501	E - 5
D502	D - 5
D503	E - 5
D504	D - 3
D506	M - 3
D507	M - 3
D508	A - 4
D509	K - 3
D510	B - 1
E1	L - 2
E2	F - 2
E201	L - 6
E202	F - 5
E501	C - 5
E502	C - 2
IC1	H - 2
IC2	G - 3
IC3	K - 2
IC4	L - 2
IC5	K - 3
IC201	H - 5
IC202	G - 4
IC203	J - 5
IC204	K - 5
IC501	D - 1
L1	H - 3
L2	G - 2
L201	I - 4
L202	G - 5
L501	A - 4
L502	B - 4
LV1	G - 2
LV2	F - 3
LV3	F - 3
LV201	G - 5
LV202	F - 4
LV203	F - 4
LV501	C - 5
LV502	C - 4
LV503	C - 4
Q1	F - 3
Q2	E - 2
Q3	F - 3
Q4	H - 3
Q6	M - 3
Q7	M - 3
Q8	B - 1
Q9	K - 1
Q10	L - 1
Q11	J - 3
Q12	J - 3
Q13	H - 2
Q15	J - 1
Q16	J - 1
Q17	L - 3
Q18	D - 3
Q19	J - 1
Q201	F - 4
Q202	F - 5
Q203	F - 4
Q204	H - 4
Q205	I - 5
Q206	L - 6
Q207	L - 5
Q208	B - 6
Q209	K - 4
Q210	L - 4
Q211	J - 4
Q212	J - 4
Q213	H - 6
Q214	I - 6
Q215	D - 6
Q216	E - 6
Q217	H - 6
Q218	D - 3
Q219	I - 5
Q220	H - 5
Q501	D - 2
Q502	D - 5
Q503	C - 5
Q504	D - 2
Q505	B - 2
Q506	M - 4
Q507	L - 3
Q508	M - 4
Q509	A - 2
Q510	A - 4
Q511	A - 3
Q512	B - 1
Q513	A - 1
Q901	J - 2
Q902	J - 3
Q903	I - 5
Q904	I - 4
RV1	G - 3
RV2	H - 3
RV3	I - 1
RV4	B - 1
RV5	M - 1
RV6	E - 2
RV201	G - 4
RV202	I - 4
RV203	I - 5
RV204	B - 6
RV205	M - 5
RV206	D - 2
RY501	D - 4
RY502	D - 5
T1	C - 1
T201	B - 6
TP1	H - 2
TP2	H - 3
TP3	M - 2
TP4	L - 2
TP5	L - 2
TP201	H - 6
TP202	H - 4
TP203	M - 5
TP204	L - 5
TP205	L - 5
TP501	E - 4
TP502	E - 4
TP503	C - 3
TP504	C - 3

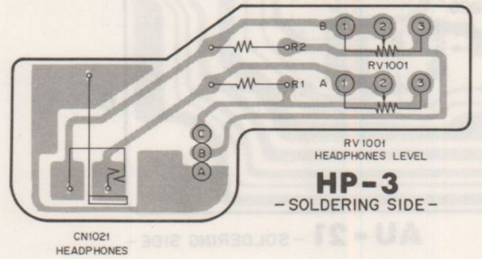
MI-3 (MIC INPUT)
HP-3 (HEADPHONES)


CN1
2
9
86
2
9
84
AU ,11-3 | 1 | AUDIO MIC CH-2 OUT (X)
AU ,11-2 | 2 | AUDIO LINE CH-2 IN (X)
AU ,11-1 | 3 | AUDIO MIC CH-2 OUT (G)
AU ,10-3 | 4 | AUDIO MIC CH-1 OUT (X)
AU ,10-2 | 5 | AUDIO LINE CH-1 IN (X)
AU ,10-1 | 6 | AUDIO MIC CH-1 OUT (G)
CN1019
MIC CH-1
CN1020
MIC CH-2
C1
0.001
C2
0.001
(CHASSIS)
MI-3


C1
C2
CN931
6
5
4
3
2
1
CN1020
CN1019

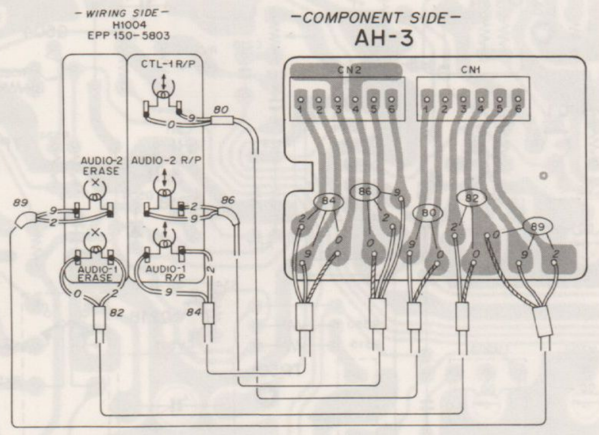
MI-3 -SOLDERING SIDE-

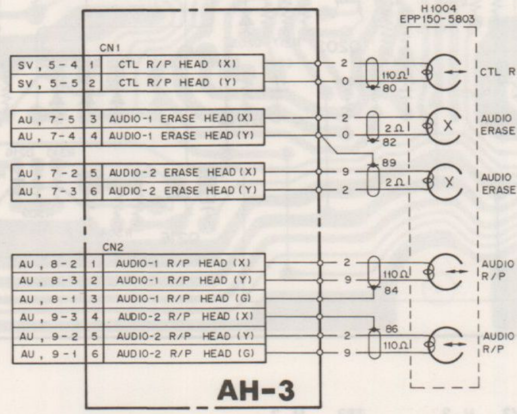

RV1001-B
CH-2
HEADPHONE LEVEL
500
RV1001-A
CH-1
HEADPHONE LEVEL
500
1
2
3
1
2
3
CN1021
HEADPHONES
R1
130
R2
130
CN1(941)
0
2
1
KY, (A) | (A) | GND
KY, (C) | (C) | CH-1 HEADPHONES IN
KY, (B) | (B) | CH-2 HEADPHONES IN
HP-3

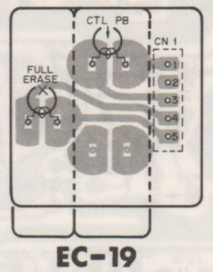

B
1
2
3
R2
RV1001
R1
A
1
2
3
C
B
A
RV1001
HEADPHONES LEVEL
CN1021
HEADPHONES

HP-3 -SOLDERING SIDE-

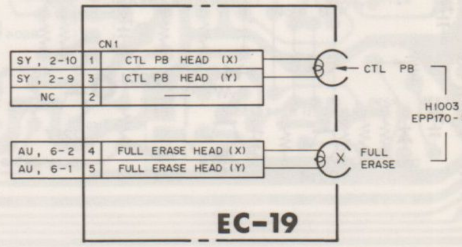
EC-19 (ERASE/CTL HEAD)
AH-3 (AUDIO HEAD)


-WIRING SIDE-
H1004
EPP 150-5803
CTL-1 R/P
80
9
0
AUDIO-2
ERASE
AUDIO-2 R/P
89
9
2
86
2
9
AUDIO-1
ERASE
AUDIO-1
R/P
0
2
82
9
2
84
-COMPONENT SIDE-
AH-3
CN2
1
2
3
4
5
6
CN1
1
2
3
4
5
6
84
86
9
2
0
9
0
80
9
0
82
2
0
89
0
9
2

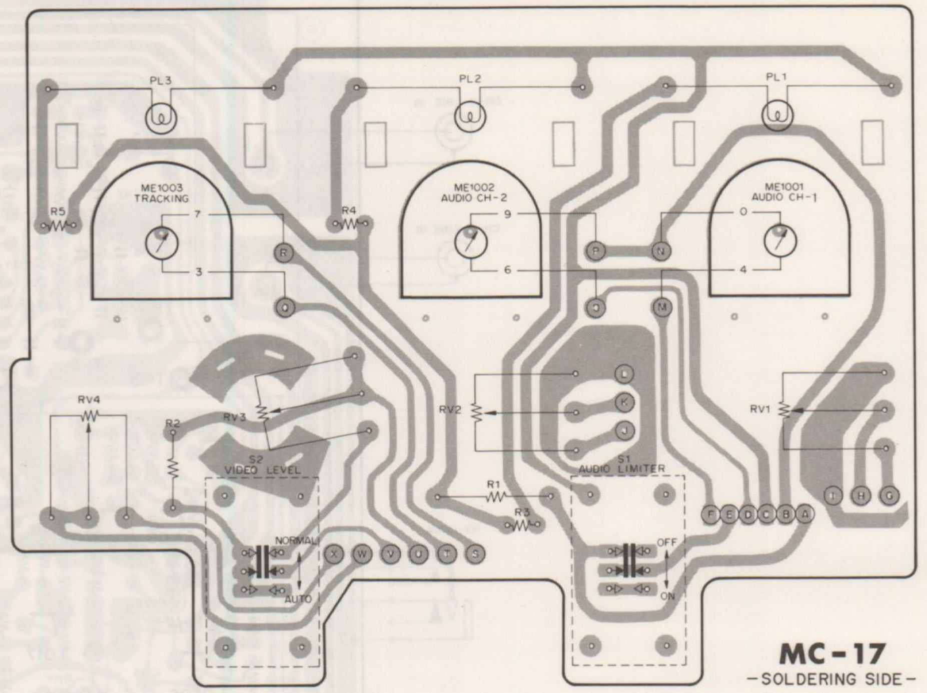

CN1
SV , 5-4 | 1 | CTL R/P HEAD (X)
SV , 5-5 | 2 | CTL R/P HEAD (Y)
AU , 7-5 | 3 | AUDIO-1 ERASE HEAD (X)
AU , 7-4 | 4 | AUDIO-1 ERASE HEAD (Y)
AU , 7-2 | 5 | AUDIO-2 ERASE HEAD (X)
AU , 7-3 | 6 | AUDIO-2 ERASE HEAD (Y)
CN2
AU , 8-2 | 1 | AUDIO-1 R/P HEAD (X)
AU , 8-3 | 2 | AUDIO-1 R/P HEAD (Y)
AU , 8-1 | 3 | AUDIO-1 R/P HEAD (G)
AU , 9-3 | 4 | AUDIO-2 R/P HEAD (X)
AU , 9-2 | 5 | AUDIO-2 R/P HEAD (Y)
AU , 9-1 | 6 | AUDIO-2 R/P HEAD (G)
H1004
EPP150-5803
2
0
110Ω
80
CTL R/P
2
0
2Ω
82
AUDIO CH-1
ERASE
89
9
2
2Ω
AUDIO CH-2
ERASE
2
9
110Ω
84
AUDIO CH-1
R/P
86
2
9
110Ω
AUDIO CH-2
R/P
AH-3


CTL PB
FULL
ERASE
CN 1
1
2
3
4
5

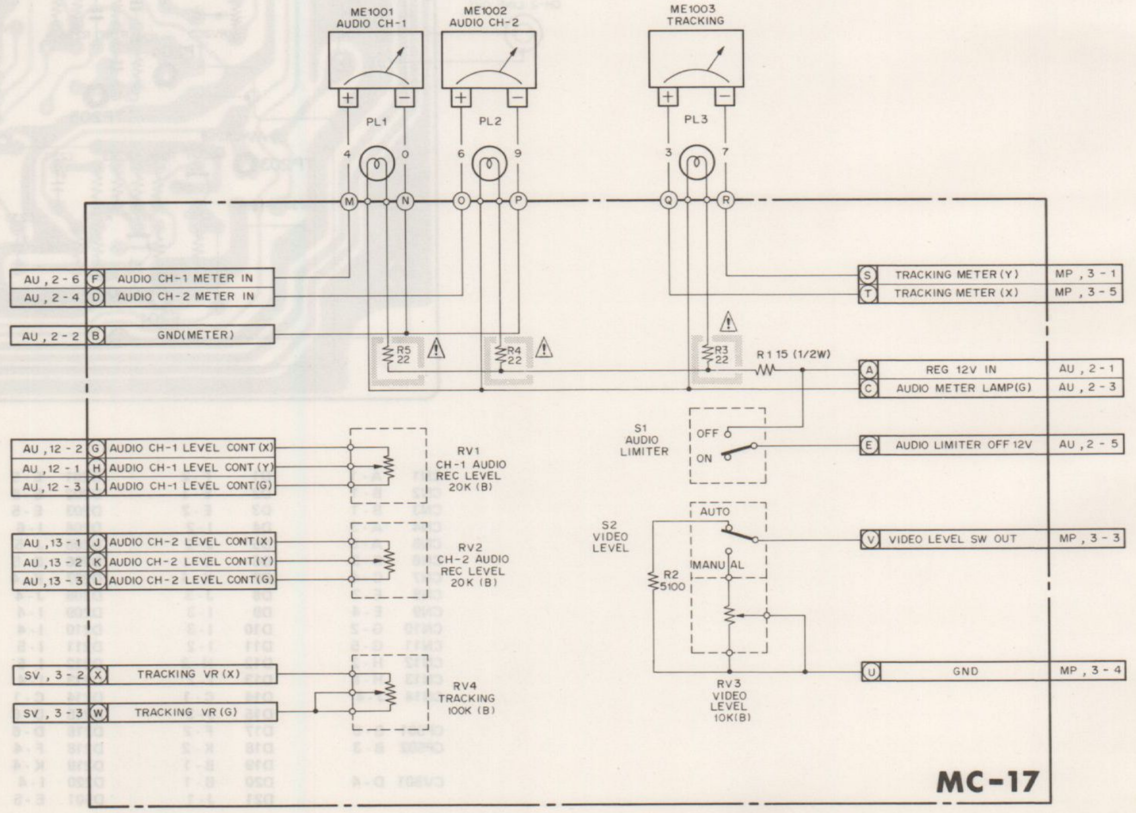
EC-19
- SOLDERING SIDE -


CN1
SY , 2-10 | 1 | CTL PB HEAD (X)
SY , 2-9 | 3 | CTL PB HEAD (Y)
NC | 2 | —
AU , 6-2 | 4 | FULL ERASE HEAD (X)
AU , 6-1 | 5 | FULL ERASE HEAD (Y)
CTL PB
H1003
EPP170-58
FULL
ERASE
EC-19

MC-17 (METER/CONTROL)

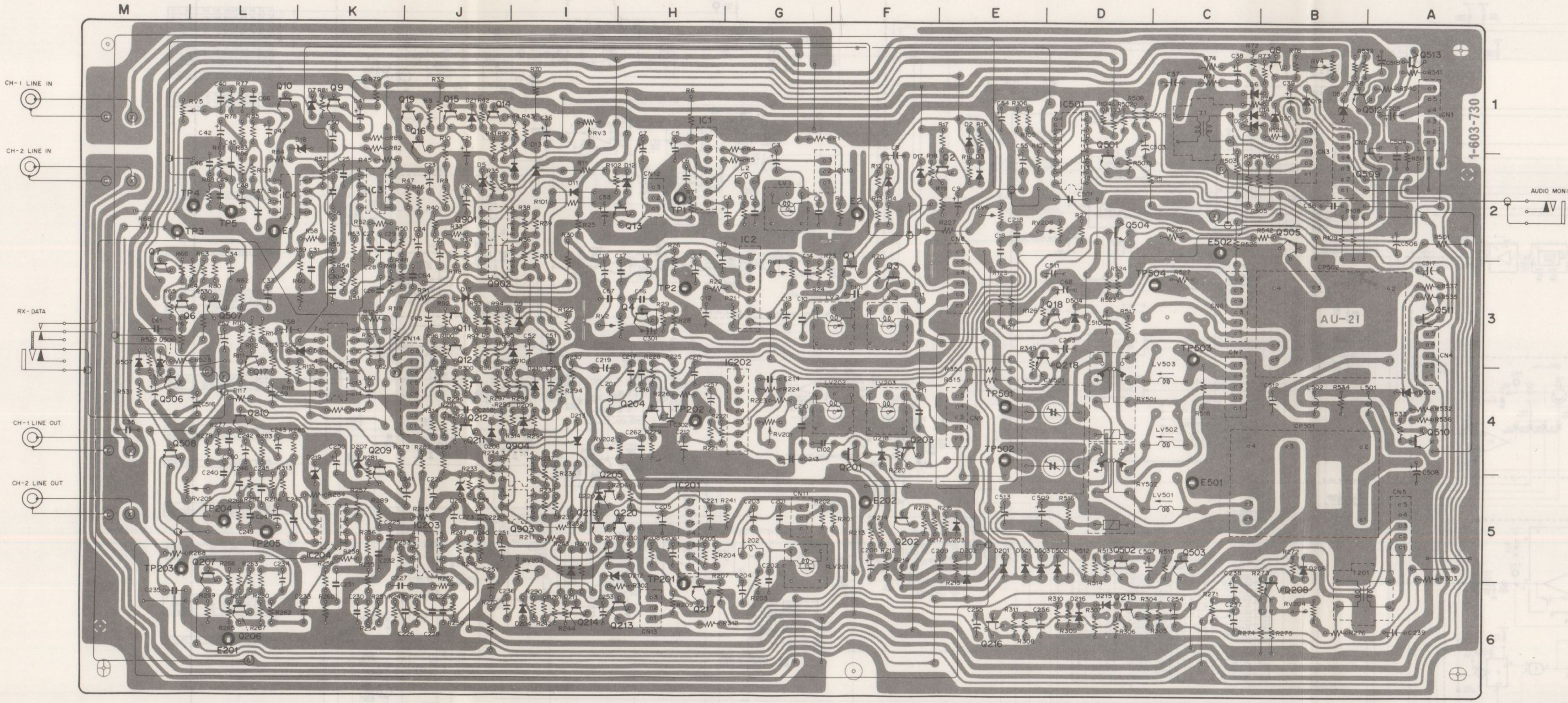

PL3
PL2
PL1
ME1003
TRACKING
ME1002
AUDIO CH-2
ME1001
AUDIO CH-1
R5
R4
7
3
9
6
0
4
R
Q
P
O
N
M
RV4
R2
RV3
S2
VIDEO LEVEL
NORMAL
AUTO
X
W
V
U
T
S
RV2
L
K
J
R1
R3
S1
AUDIO LIMITER
OFF
ON
RV1
F
E
D
C
B
A
I
H
G

MC-17
-SOLDERING SIDE-


ME1001
AUDIO CH-1
ME1002
AUDIO CH-2
ME1003
TRACKING
PL1
PL2
PL3
4
0
6
9
3
7
M
N
O
P
Q
R
AU , 2-6 | (F) | AUDIO CH-1 METER IN
AU , 2-4 | (D) | AUDIO CH-2 METER IN
AU , 2-2 | (B) | GND(METER)
R5
22
R4
22
R3
22
R1 15 (1/2W)
(S) | TRACKING METER (Y) | MP , 3-1
(T) | TRACKING METER (X) | MP , 3-5
(A) | REG 12V IN | AU , 2-1
(C) | AUDIO METER LAMP(G) | AU , 2-3
S1
AUDIO
LIMITER
OFF
ON
(E) | AUDIO LIMITER OFF 12V | AU , 2-5
AU ,12-2 | (G) | AUDIO CH-1 LEVEL CONT (X)
AU ,12-1 | (H) | AUDIO CH-1 LEVEL CONT (Y)
AU ,12-3 | (I) | AUDIO CH-1 LEVEL CONT(G)
RV1
CH-1 AUDIO
REC LEVEL
20K (B)
AU ,13-1 | (J) | AUDIO CH-2 LEVEL CONT(X)
AU ,13-2 | (K) | AUDIO CH-2 LEVEL CONT(Y)
AU ,13-3 | (L) | AUDIO CH-2 LEVEL CONT(G)
RV2
CH-2 AUDIO
REC LEVEL
20K (B)
S2
VIDEO
LEVEL
AUTO
MANUAL
R2
5100
(V) | VIDEO LEVEL SW OUT | MP , 3-3
(U) | GND | MP , 3-4
RV3
VIDEO
LEVEL
10K(B)
SV , 3-2 | (X) | TRACKING VR (X)
SV , 3-3 | (W) | TRACKING VR (G)
RV4
TRACKING
100K (B)
MC-17

AU-21 (AUDIO)

10181 AND LATER (AEP)
10021 AND LATER (UK)

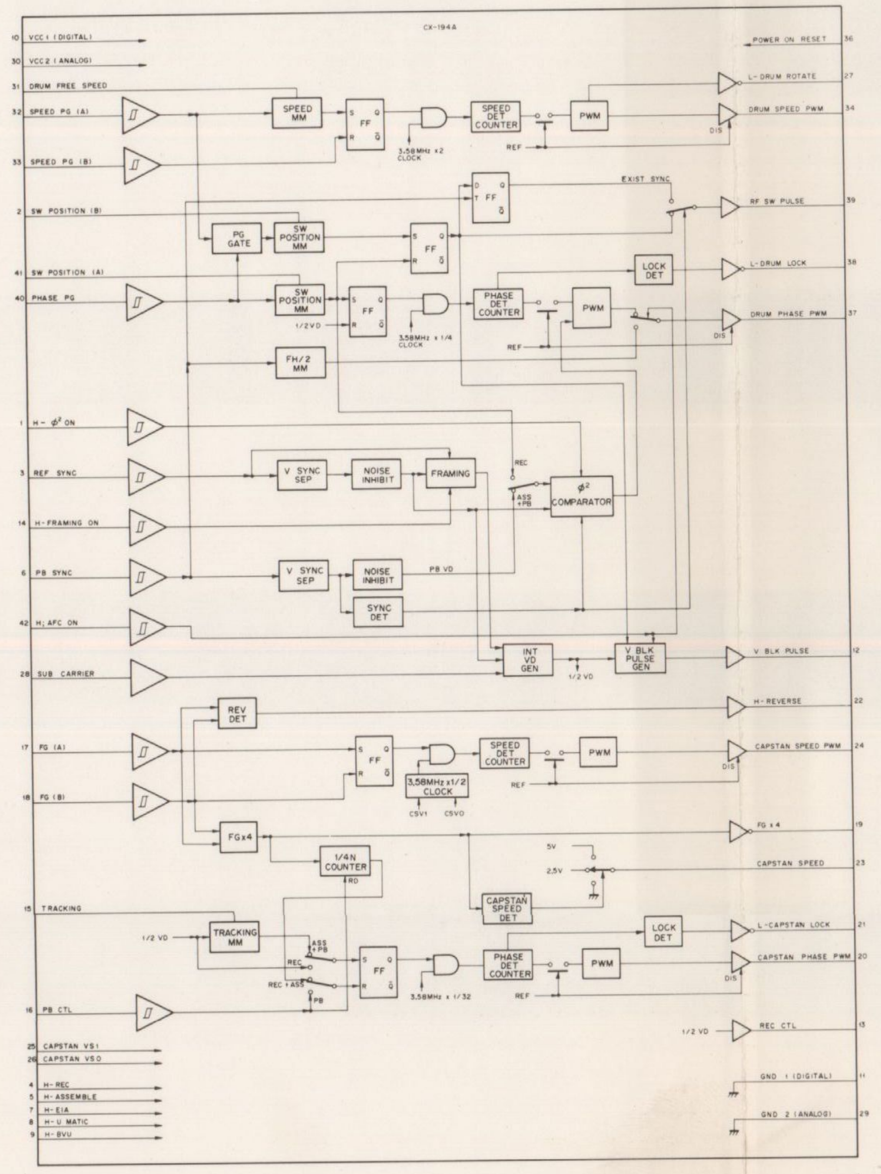


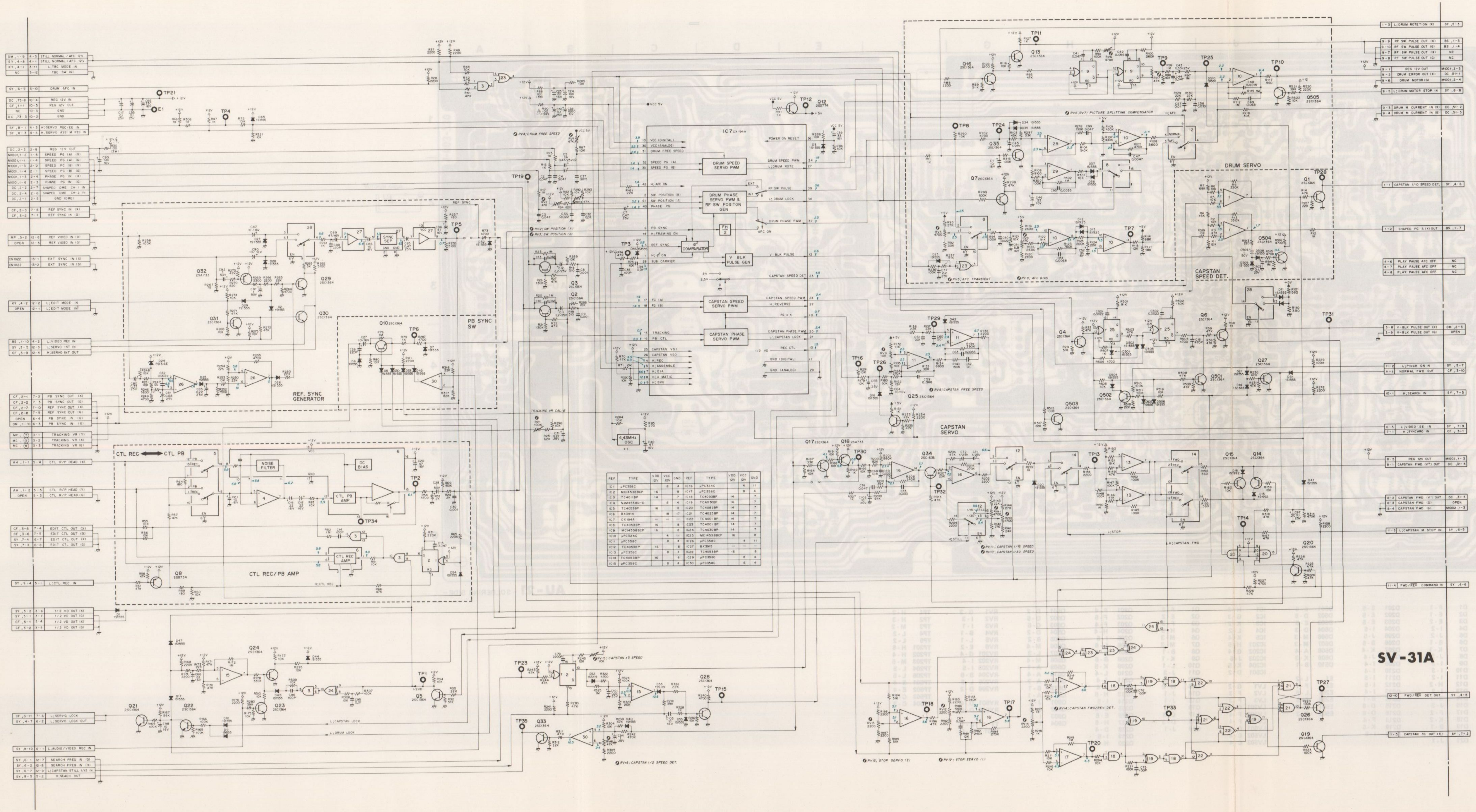
AU-21 -SOLDERING SIDE-

CN1	A-1
CN2	B-2
CN3	B-2
CN4	A-3
CN5	A-5
CN6	C-3
CN7	C-4
CN8	E-3
CN9	E-4
CN10	G-2
CN11	G-5
CN12	H-2
CN13	H-6
CN14	J-4
CP501	B-5
CP502	B-3
CV501	D-4
D1	F-1
D2	E-1
D3	E-2
D4	I-2
D5	J-2
D6	B-1
D7	K-1
D8	J-3
D9	I-3
D10	I-3
D11	I-2
D12	H-2
D13	I-2
D14	B-1
D15	J-3
D17	F-2
D18	K-2
D19	B-1
D20	B-1
D21	J-1
D201	E-5
D202	E-5
D203	E-5
D204	I-6
D205	J-5
D206	B-5
D207	K-4
D208	J-4
D209	I-4
D210	I-4
D211	I-5
D212	I-5
D213	I-4
D214	B-1
D215	D-6
D216	D-6
D218	F-4
D219	K-5
D220	I-5
D501	E-5
D502	D-5
D503	E-5
D504	D-3
D506	M-3
D507	M-3
D508	A-4
D509	K-3
D510	B-1
E1	L-2
E2	F-1
E201	L-6
E202	F-5
E501	C-5
E502	C-2
IC1	H-2
IC2	G-3
IC3	K-2
IC4	L-2
IC5	K-4
IC201	H-5
IC202	G-4
IC203	J-5
IC204	K-5
IC501	D-2
LV1	G-2
LV2	F-3
LV3	F-3
LV201	G-5
LV202	F-4
LV203	F-4
LV501	C-5
LV502	C-4
LV503	C-4
Q1	F-3
Q2	E-2
Q3	F-3
Q4	H-3
Q6	M-3
Q7	M-3
Q8	B-1
Q9	K-1
Q10	L-1
Q11	J-3
Q12	J-3
Q13	H-2
Q14	J-1
Q15	J-1
Q16	J-1
Q17	L-3
Q18	D-3
Q19	J-1
Q201	F-4
Q202	F-5
Q203	F-4
Q204	H-4
Q205	I-5
Q206	L-6
Q207	L-6
Q208	B-6
Q209	K-5
Q210	L-4
Q211	J-4
Q212	J-4
Q213	H-6
Q214	I-6
Q215	D-6
Q216	E-6
Q217	H-6
Q218	D-4
Q219	I-5
Q220	H-5
Q501	D-2
Q502	D-5
Q503	C-5
Q504	D-2
Q505	B-2
Q506	M-4
Q507	L-3
Q508	M-4
Q509	A-1
Q510	A-4
Q511	A-3
Q512	B-1
Q513	A-1
Q901	J-2
Q902	J-3
Q903	I-5
Q904	I-5
RV1	G-3
RV2	I-3
RV3	I-1
RV4	B-1
RV5	L-1
RV6	E-2
RV201	G-4
RV202	I-4
RV203	I-5
RV204	B-6
RV205	L-5
RV206	D-2
RY501	D-4
RY502	D-5
T1	C-1
T201	B-6
TP1	H-2
TP2	H-3
TP3	M-2
TP4	L-2
TP5	L-2
TP201	H-6
TP202	H-4
TP203	M-5
TP204	L-5
TP205	L-5
TP501	E-4
TP502	E-4
TP503	C-3
TP504	C-3

SV-31A (DRUM/CAPSTAN PWM SERVO)

UP TO 10180 (AEP)



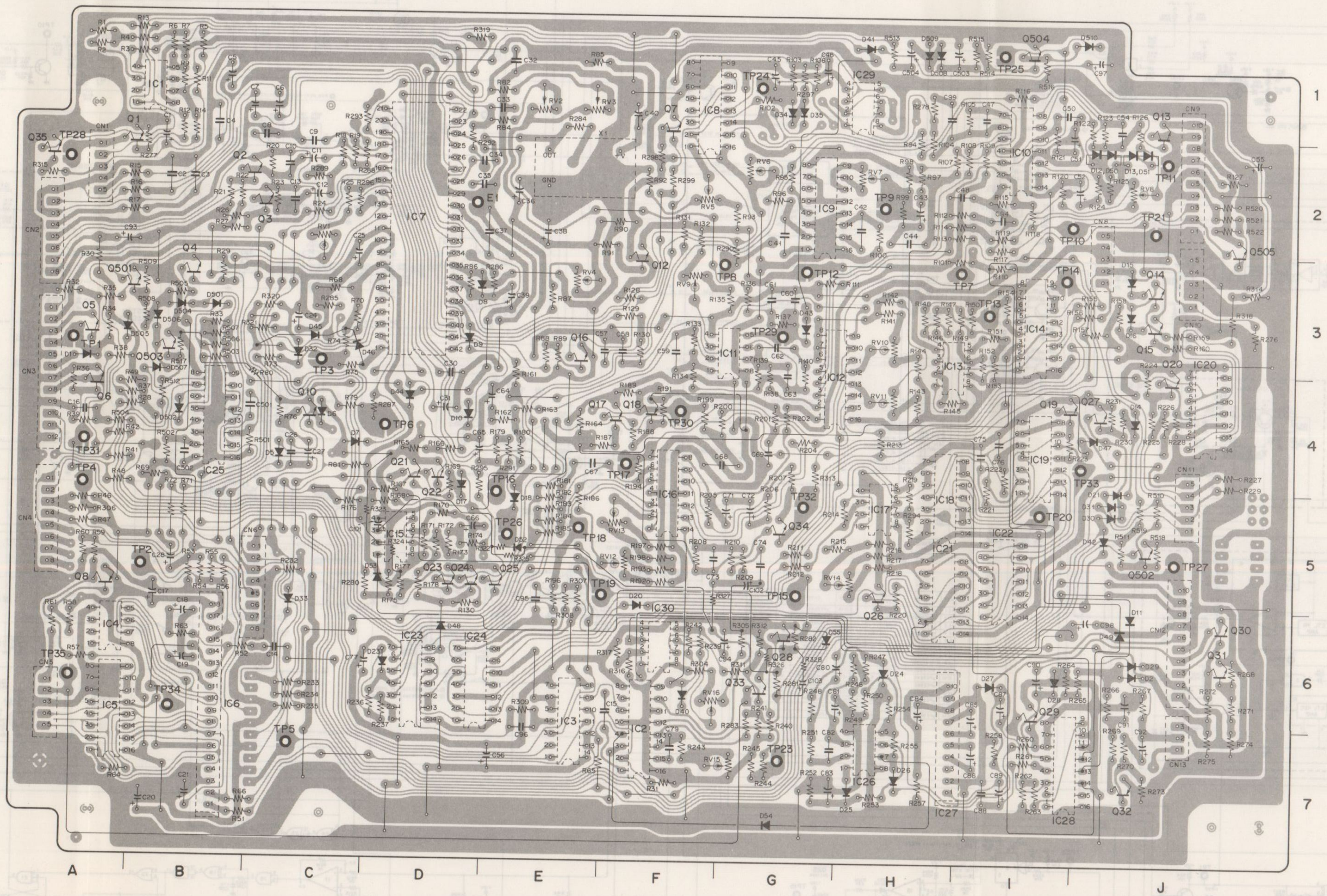

REF. SYNC
GENERATOR
PB SYNC
SW
CTL REC ⟷ CTL PB
CTL REC/PB AMP
DRUM SERVO
CAPSTAN
SPEED DET.
CAPSTAN
SERVO
SV-31A

NOTE: The shaded and ⚠ -marked components are critical to safety.
Replace only with same components as specified.

SV-31A (DRUM/CAPSTAN PWM SERVO)

UP TO 10180 (AEP)

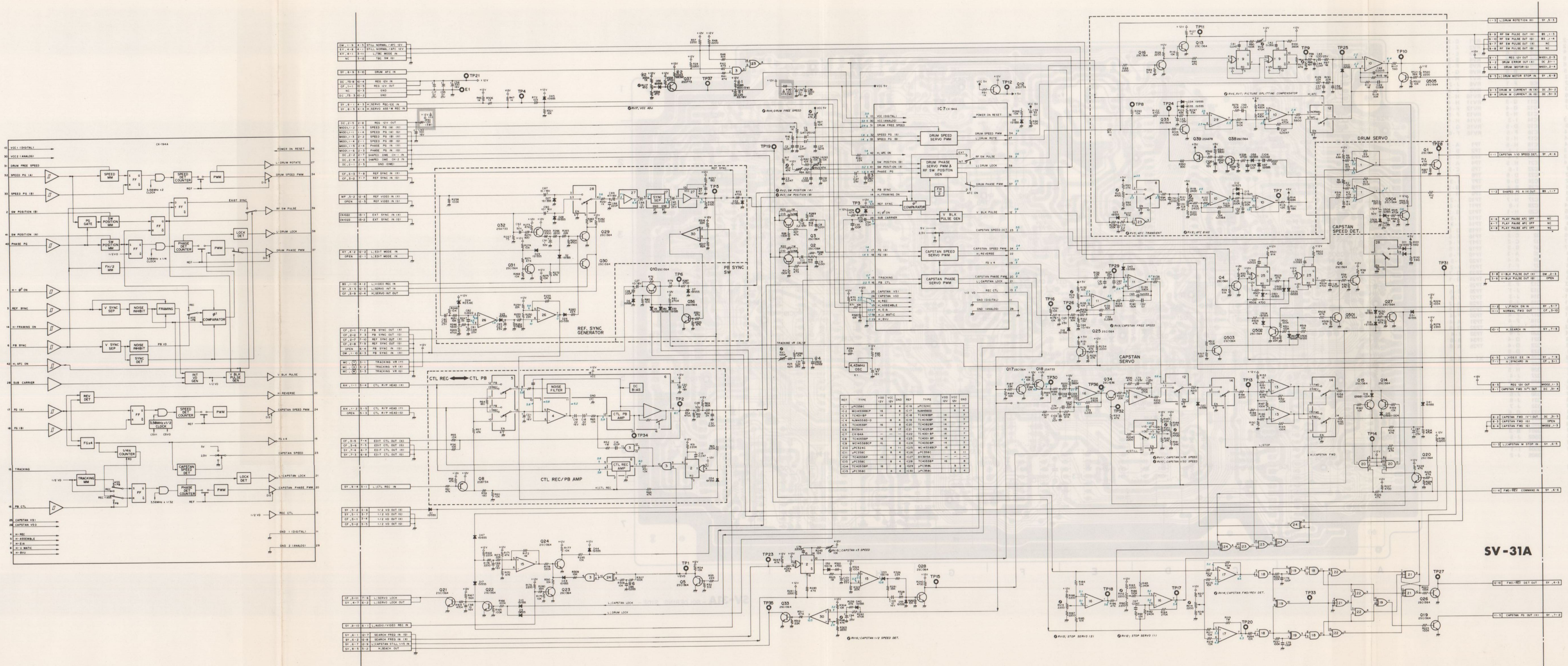
CN1	A-2
CN2	A-2
CN3	A-4
CN4	A-5
CN5	A-6
CN6	C-5
CN8	J-2
CN9	J-2
CN10	J-3
CN11	J-5
CN12	J-6
CN13	J-7
D1	A-3
D2	J-6
D5	C-4
D6	C-4
D7	C-4
D8	D-3
D9	D-3
D10	D-4
D11	I-7
D12	J-2
D13	J-2
D14	J-4
D15	J-3
D16	J-3
D17	D-4
D18	E-5
D20	F-6
D21	J-4
D23	D-6
D24	H-6
D25	H-7
D26	H-7
D27	I-6
D28	I-6
D29	J-6
D30	J-5
D31	J-5
D32	C-3
D33	C-6
D34	G-1
D35	G-1
D40	F-6
D41	H-1
D42	J-5
D43	G-3
D44	D-4
D45	C-3
D46	C-3
D47	J-4
D48	D-6
D49	J-6
D50	J-2
D51	J-2
D52	E-5
D53	D-5
D54	G-7
D55	G-6
D501	B-3
D502	B-4
D504	B-3
D505	A-3
D506	B-3
D507	B-4
D508	H-1
D509	H-1
D510	J-1
E1	D-2
IC1	B-1
IC2	F-7
IC3	E-6
IC4	A-6
IC5	A-6
IC6	B-5
IC7	D-2
IC8	F-1
IC9	G-2
IC10	I-2
IC11	G-3
IC12	G-4
IC13	H-3
IC14	I-3
IC15	D-5
IC16	F-5
IC17	H-5
IC18	H-5
IC19	I-4
IC20	J-4
IC21	H-5
IC22	I-5
IC23	D-6
IC24	D-6
IC25	B-4
IC26	H-7
IC27	H-7
IC28	I-8
IC29	H-1
IC30	F-6
Q1	B-2
Q2	C-2
Q3	C-2
Q4	B-3
Q5	A-3
Q6	A-4
Q7	F-1
Q8	A-5
Q10	C-4
Q12	F-3
Q13	J-1
Q14	J-3
Q15	J-3
Q16	E-3
Q17	F-4
Q18	F-4
Q19	I-4
Q20	J-4
Q21	D-4
Q22	D-4
Q23	D-5
Q24	D-5
Q25	E-5
Q26	H-5
Q27	J-4
Q28	G-6
Q29	I-6
Q30	J-6
Q31	J-6
Q32	J-7
Q33	G-6
Q34	G-5
Q35	A-2
Q501	B-3
Q502	J-5
Q503	C-2
Q504	I-1
Q505	J-2
RV1	C-2
RV2	E-1
RV3	E-1
RV4	E-3
RV5	F-2
RV6	G-2
RV7	H-2
RV8	J-2
RV9	F-3
RV10	H-3
RV11	H-4
RV12	F-5
RV13	F-5
RV14	H-5
RV15	G-7
RV16	F-6
TP1	A-3
TP2	B-5
TP3	C-3
TP4	A-5
TP5	C-7
TP6	D-4
TP7	I-3
TP8	G-3
TP9	H-2
TP10	I-2
TP11	J-2
TP12	G-3
TP13	I-3
TP14	I-3
TP15	G-5
TP16	E-5
TP17	F-4
TP18	E-5
TP19	F-5
TP20	I-5
TP21	J-2
TP23	G-7
TP24	G-1
TP25	I-1
TP26	E-5
TP27	J-5
TP28	A-2
TP29	G-3
TP30	F-4
TP31	A-4
TP32	G-5
TP33	J-4
TP34	B-6
TP35	A-6
X1	E-2



SV-31A -SOLDERING SIDE-

SV-31A (DRUM/CAPSTAN PWM SERVO)

S/N 10181 ~ 17010 (AEP)
S/N 10021 ~ 11350 (UK)



SPEED MM
SPEED DET COUNTER
PWM
FF
SW POSITION MM
PHASE DET COUNTER
LOCK DET
FH/2
V SYNC SEP
NOISE INHIBIT
FRAMING
ϕ COMPARATOR
SYNC DET
V BLK PULSE GEN
REV DET
CAPSTAN SPEED DET
TRACKING MM
REF. SYNC GENERATOR
PB SYNC SW
CTL REC ⟷ CTL PB
NOISE FILTER
DC BIAS
CTL PB AMP
CTL REC AMP
CTL REC / PB AMP
IC7
DRUM SPEED SERVO PWM
DRUM PHASE SERVO PWM & 90 SW POSITION GEN
COMPARATOR
V BLK PULSE GEN
CAPSTAN SPEED SERVO PWM
CAPSTAN PHASE SERVO PWM
DRUM SERVO
CAPSTAN SPEED DET.
CAPSTAN SERVO
SV-31A

NOTE

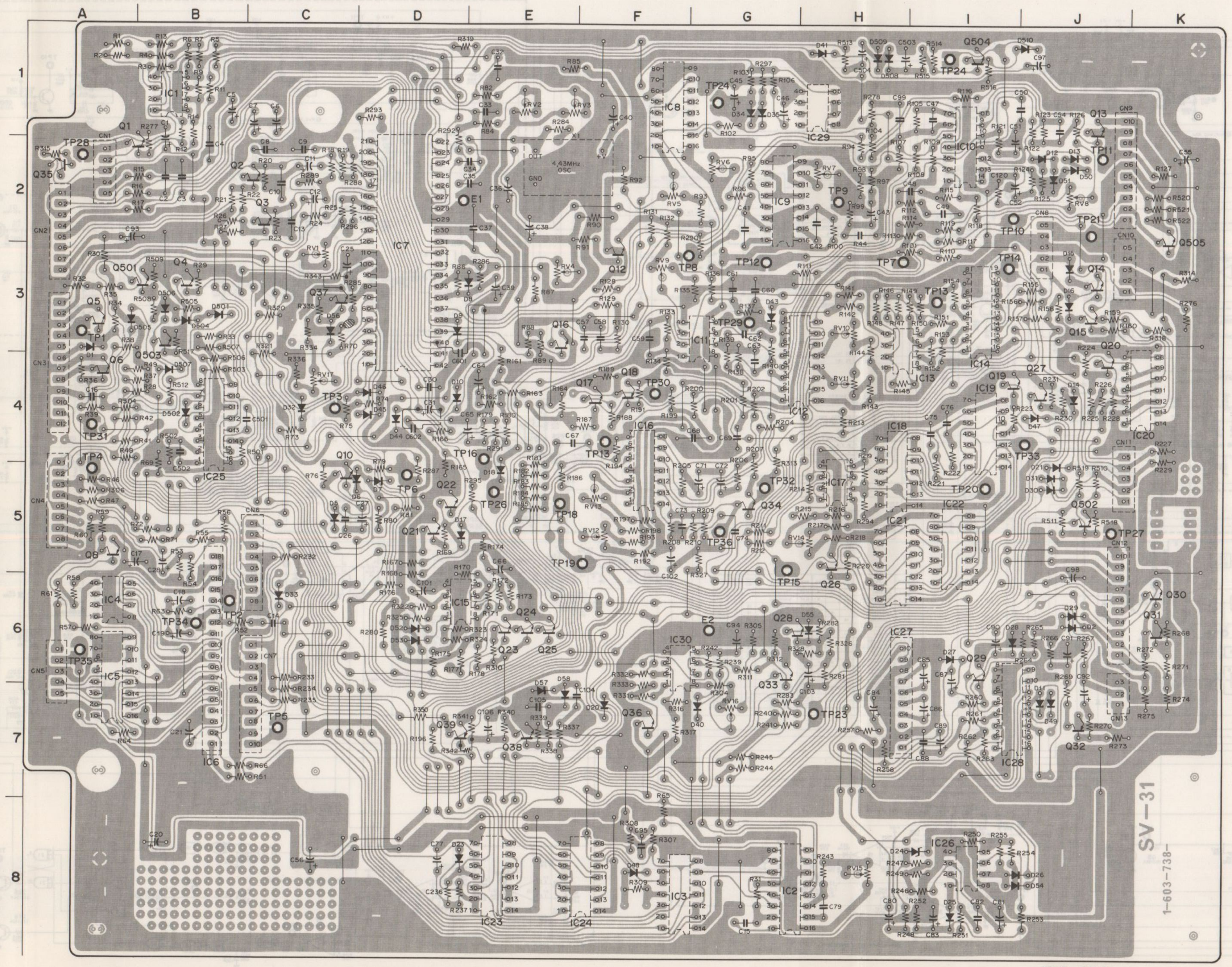
MARK	CHANGE INFORMATION	SERIAL NO.
※1	C25 22/16V ADDED R285 150 (1/2W) ADDED	P. AEP; 10181 ~ P. UK; 10021 ~ S. AEP; 10001 ~
※2	R334 100 → 1K R343 75 (1/2W) → 68 (3W)	P. AEP; 10381 ~ P. UK; 10121 ~ S. AEP; 10051 ~
※3	C601 0.01 ADDED	P. AEP; 10681 ~ P. UK; 10221 ~ S. AEP; 10051 ~
※4	C602 0.022 ADDED	P. AEP; 11081 ~ P. UK; 10321 ~ S. AEP; 10051 ~
※5	IC17 μPC358C ↓ NJM4560D	P. AEP; 11481 ~ P. UK; 10321 ~ S. AEP; 10051 ~
※6	C95 0.01 → 0.033	P. AEP; 13431 ~ P. UK; 10721 ~ S. AEP; 10151 ~

NOTE: **The shaded and ⚠ -marked components are critical to safety.**
Replace only with same components as specified.

SV-31A (DRUM/CAPSTAN PWM SERVO)

S/N 10181 ~ 17010 (AEP)
S/N 10021 ~ 11350 (UK)

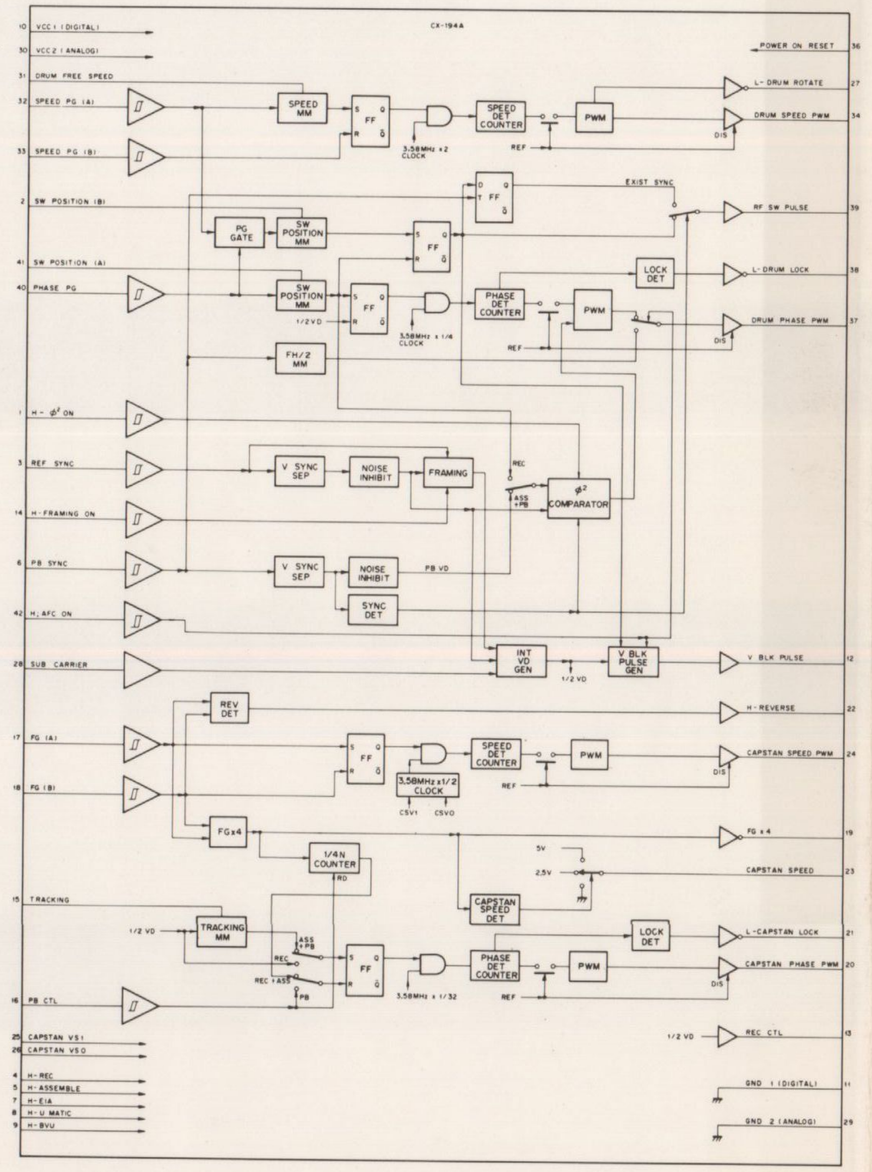
CN1	A - 2
CN2	A - 3
CN3	A - 4
CN4	A - 5
CN5	A - 6
CN6	C - 5
CN7	D - 5
CN8	J - 2
CN9	J - 2
CN10	J - 3
CN11	J - 5
CN12	J - 6
CN13	J - 6
D1	A - 4
D2	J - 6
D5	C - 5
D6	C - 5
D7	D - 5
D8	D - 3
D9	D - 3
D10	D - 4
D11	J - 7
D12	J - 2
D13	J - 2
D14	J - 4
D15	J - 3
D16	J - 3
D17	D - 5
D18	E - 5
D20	F - 7
D21	J - 5
D23	D - 8
D24	I - 8
D25	I - 8
D26	I - 8
D27	I - 6
D28	I - 6
D29	J - 6
D30	J - 5
D31	J - 5
D32	C - 4
D33	C - 6
D34	G - 1
D35	G - 1
D40	G - 7
D41	H - 1
D43	G - 3
D44	D - 4
D45	D - 4
D46	D - 4
D47	J - 4
D48	F - 8
D49	J - 7
D50	J - 2
D51	J - 2
D52	D - 6
D53	D - 6
D54	I - 8
D55	H - 6
D56	C - 3
D57	E - 7
D58	E - 7
D501	B - 3
D502	B - 4
D504	B - 3
D505	A - 3
D506	B - 3
D508	H - 1
D509	H - 1
D510	I - 1
E1	D - 2
E2	G - 6
IC1	B - 1
IC2	G - 8
IC3	F - 8
IC4	A - 6
IC5	A - 6
IC6	B - 6
IC7	D - 3
IC8	F - 1
IC9	G - 2
IC10	I - 2
IC11	F - 3
IC12	G - 4
IC13	H - 3
IC14	I - 3
IC15	D - 6
IC16	F - 5
IC17	H - 5
IC18	H - 5
IC19	I - 4
IC20	K - 4
IC21	H - 5
IC22	H - 5
IC23	E - 8
IC24	F - 8
IC25	B - 4
IC26	I - 8
IC27	H - 7
IC28	I - 7
IC29	H - 1
IC30	F - 6
Q1	A - 2
Q2	B - 2
Q3	C - 2
Q4	B - 3
Q5	A - 3
Q6	A - 4
Q8	A - 5
Q10	C - 5
Q12	F - 3
Q13	J - 1
Q14	J - 3
Q15	J - 3
Q16	E - 3
Q17	E - 4
Q18	F - 4
Q19	I - 4
Q20	J - 4
Q21	D - 5
Q22	D - 5
Q23	E - 6
Q24	E - 6
Q25	E - 6
Q26	H - 5
Q27	J - 4
Q28	G - 6
Q29	I - 6
Q30	K - 6
Q31	K - 6
Q32	J - 7
Q33	G - 6
Q34	G - 5
Q35	A - 2
Q36	F - 7
Q37	C - 3
Q38	E - 7
Q39	D - 7
Q501	A - 3
Q502	J - 5
Q503	B - 3
Q504	I - 1
Q505	K - 2
RV1	C - 3
RV2	E - 1
RV3	E - 1
RV4	E - 3
RV5	F - 2
RV6	G - 2
RV7	H - 2
RV8	J - 2
RV9	F - 3
RV10	H - 3
RV11	H - 4
RV12	F - 5
RV13	F - 5
RV14	G - 5
RV15	H - 8
RV16	G - 7
RV17	C - 4
TP1	A - 3
TP2	B - 6
TP3	C - 4
TP4	A - 5
TP5	C - 7
TP6	D - 5
TP7	H - 3
TP8	F - 3
TP9	H - 2
TP10	I - 2
TP11	J - 2
TP12	G - 3
TP13	I - 3
TP14	I - 3
TP15	G - 5
TP16	E - 5
TP17	F - 4
TP18	E - 5
TP19	E - 5
TP20	I - 5
TP21	J - 2
TP23	H - 7
TP24	G - 1
TP25	I - 1
TP26	E - 5
TP27	J - 5
TP28	A - 2
TP29	G - 3
TP30	F - 4
TP31	A - 4
TP32	G - 5
TP33	I - 4
TP34	B - 6
TP35	A - 6
TP36	G - 5
X1	E - 2

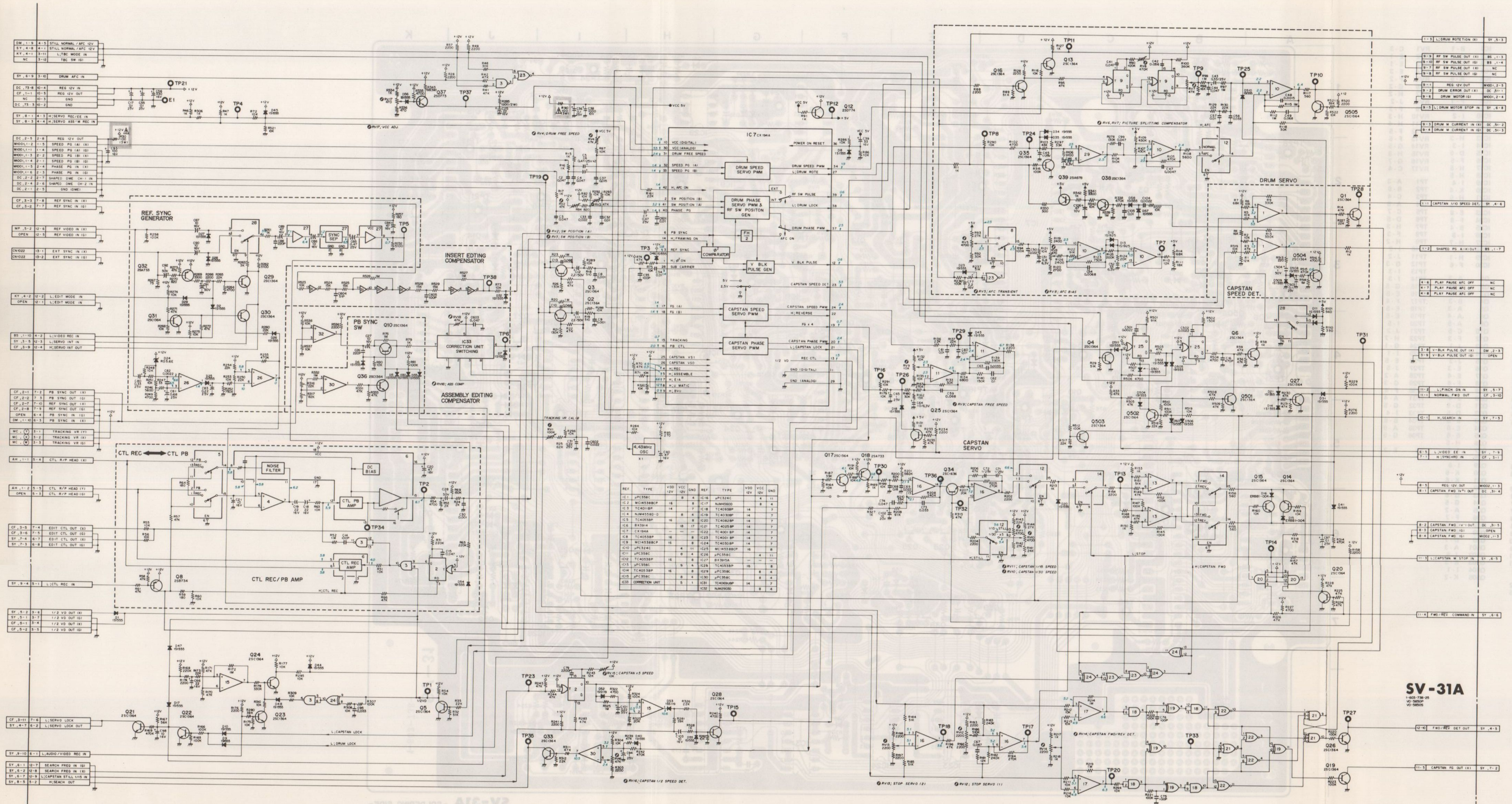


SV-31A -SOLDERING SIDE-

SV-31A (DRUM/CAPSTAN PWM SERVO)

S/N 17011 AND LATER (AEP)
S/N 11351 AND LATER (UK)


SPEED MM
FF
SPEED DET COUNTER
PWM
DRUM ROTATE
DRUM SPEED PWM
RF SW PULSE
PHASE DET COUNTER
LOCK DET
DRUM PHASE PWM
V SYNC SEP
NOISE INHIBIT
FRAMING
COMPARATOR
V BLK PULSE GEN
REC CTL
TRACKING MM
CAPSTAN SPEED PWM
CAPSTAN PHASE PWM
CAPSTAN LOCK
GND


REF. SYNC GENERATOR
INSERT EDITING COMPENSATOR
PB SYNC SW
ASSEMBLY EDITING COMPENSATOR
CORRECTION UNIT SWITCHING
CTL REC
CTL PB
NOISE FILTER
DC BIAS
CTL PB AMP
CTL REC AMP
CTL REC/PB AMP
IC7 CX194A
DRUM SPEED SERVO PWM
DRUM PHASE SERVO PWM & RF SW POSITION GEN
V BLK PULSE GEN
COMPARATOR
CAPSTAN SPEED SERVO PWM
CAPSTAN PHASE SERVO PWM
4.43MHz OSC
DRUM SERVO
CAPSTAN SPEED DET.
CAPSTAN SERVO
SV-31A
1-603-738-25
VO-5850P
VO-5850S
FWD/REV DET OUT
CAPSTAN FG OUT (X)

REF	TYPE	VDD 12V	VCC 12V	GND	REF	TYPE	VDD 12V	VCC 12V	GND
IC1	μPC358C		8	4	IC16	μPC324C		4	11
IC2	MC14538BCP	16		8	IC17	NJM4560D		8	4
IC3	TC4011BP	14		7	IC18	TC4093BP	14		7
IC4	NJM4558D-D		8	4	IC19	TC4030BP	14		7
IC5	TC4053BP	16		8	IC20	TC4082BP	14		7
IC6	BX3914		18	17	IC21	TC4025BP	14		7
IC7	CX194A	—	—	—	IC22	TC4001BP	14		7
IC8	TC4053BP	16		8	IC23	TC4001BP	14		7
IC9	MC14538BCP	16		8	IC24	TC4030BP	14		7
IC10	μPC324C		4	11	IC25	MC14538BCP	16		8
IC11	μPC358C		8	4	IC26	μPC358C		4	11
IC12	TC4053BP	16		8	IC27	BX3915A	—	—	—
IC13	μPC358C		8	4	IC28	TC4053BP	16		8
IC14	TC4053BP	16		8	IC29	μPC358C		8	4
IC15	μPC358C		8	4	IC30	μPC358C		8	4
IC33	CORRECTION UNIT		5	1	IC31	TC4069UBP	14		7
					IC32	NJM2903D		8	4

NOTE: **The shaded and ⚠ -marked components are critical to safety.**
Replace only with same components as specified.

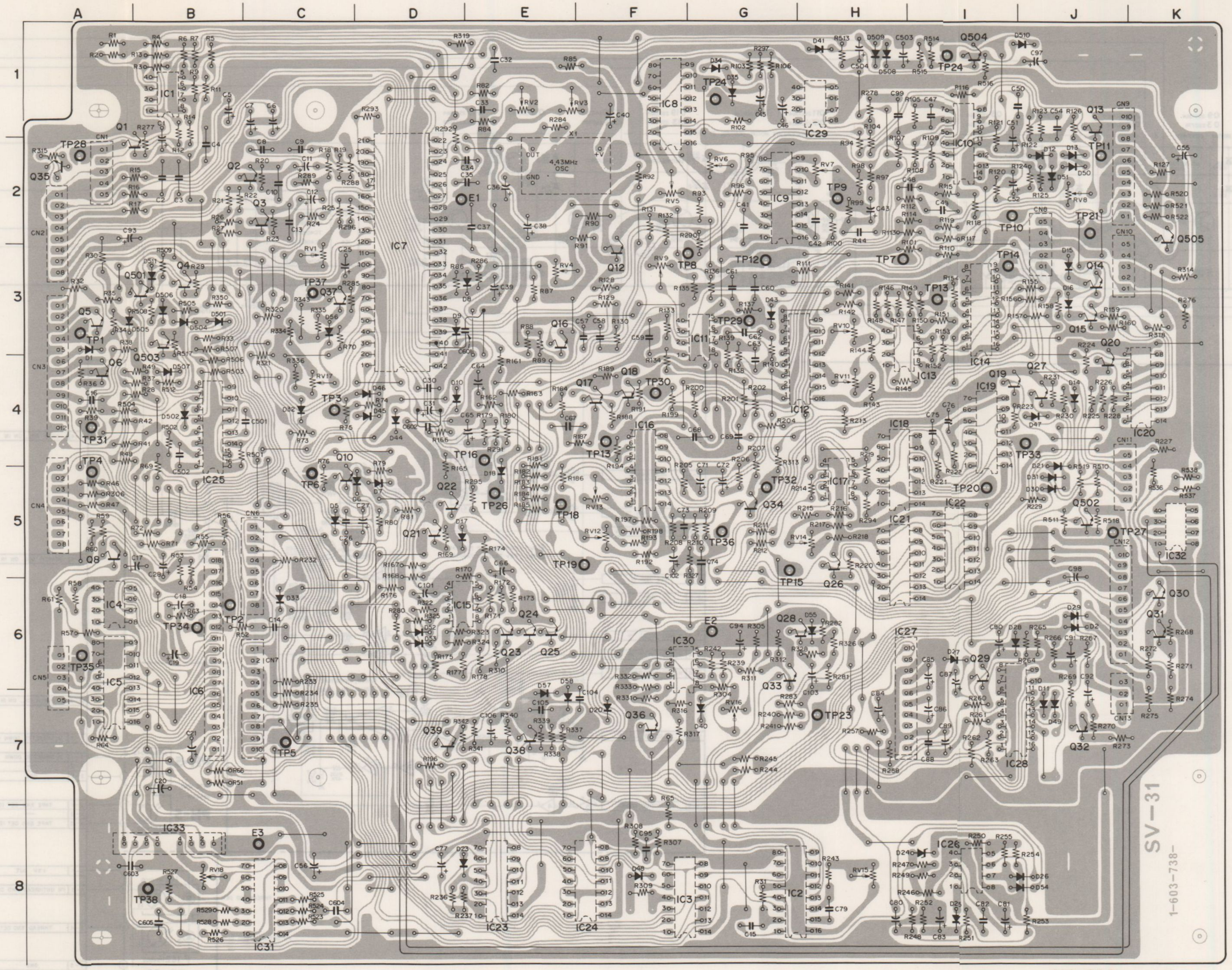
SV-31A (DRUM/CAPSTAN PWM SERVO)

S/N 17011 AND LATER (AEP)
S/N 11351 AND LATER (UK)

CN1	A - 2
CN2	A - 3
CN3	A - 4
CN4	A - 5
CN5	A - 6
CN6	C - 5
CN7	D - 5
CN8	J - 2
CN9	J - 2
CN10	J - 3
CN11	J - 5
CN12	J - 6
CN13	J - 6
D1	A - 4
D2	J - 6
D5	C - 5
D6	C - 5
D7	D - 5
D8	D - 3
D9	D - 3
D10	D - 4
D11	J - 7
D12	J - 2
D13	J - 2
D14	J - 4
D15	J - 3
D16	J - 3
D17	D - 5
D18	E - 5
D20	F - 7
D21	J - 5
D23	D - 8
D24	I - 8
D25	I - 8
D26	I - 8
D27	I - 6
D28	I - 6
D29	J - 6
D30	J - 5
D31	J - 5
D32	C - 4
D33	C - 6
D34	G - 1
D35	G - 1
D40	G - 7
D41	H - 1
D43	G - 3
D44	D - 4
D45	D - 4
D46	D - 4
D47	J - 4
D48	F - 8
D49	J - 7
D50	J - 2
D51	J - 2
D52	D - 6
D53	D - 6
D54	I - 8
D55	H - 6
D56	C - 3
D57	E - 7
D58	E - 7
D501	B - 3
D502	B - 4
D504	B - 3
D505	A - 3
D506	B - 3
D508	H - 1
D509	H - 1
D510	I - 1
D511	B - 3
E1	D - 2
E2	G - 6
E3	C - 8

IC1	B - 1
IC2	G - 8
IC3	F - 8
IC4	A - 6
IC5	A - 6
IC6	B - 6
IC7	D - 3
IC8	F - 1
IC9	G - 2
IC10	I - 2
IC11	F - 3
IC12	G - 4
IC13	H - 3
IC14	I - 3
IC15	D - 6
IC16	F - 5
IC17	H - 5
IC18	H - 5
IC19	I - 4
IC20	K - 4
IC21	H - 5
IC22	H - 5
IC23	E - 8
IC24	F - 8
IC25	B - 4
IC26	I - 8
IC27	H - 7
IC28	I - 7
IC29	H - 1
IC30	F - 6
IC31	C - 8
IC32	K - 5
IC33	B - 8
Q1	A - 2
Q2	B - 2
Q3	C - 2
Q4	B - 3
Q5	A - 3
Q6	A - 4
Q8	A - 5
Q10	C - 5
Q12	F - 3
Q13	J - 1
Q14	J - 3
Q15	J - 3
Q16	E - 3
Q17	E - 4
Q18	F - 4
Q19	I - 4
Q20	J - 4
Q21	D - 5
Q22	D - 5
Q23	E - 6
Q24	E - 6
Q25	E - 6
Q26	H - 5
Q27	J - 4
Q28	G - 6
Q29	I - 6
Q30	K - 6
Q31	K - 5
Q32	J - 7
Q33	G - 6
Q34	G - 5
Q35	A - 2
Q36	F - 7
Q37	C - 3
Q38	E - 7
Q39	D - 7
Q501	B - 3
Q502	J - 5
Q503	B - 3
Q504	I - 1
Q505	K - 2

RV1	C - 3
RV2	E - 1
RV3	E - 1
RV4	E - 3
RV5	F - 2
RV6	G - 2
RV7	H - 2
RV8	J - 2
RV9	F - 3
RV10	H - 3
RV11	H - 4
RV12	F - 5
RV13	F - 5
RV14	G - 5
RV15	H - 8
RV16	G - 7
RV17	C - 4
TP1	A - 3
TP2	B - 6
TP3	C - 4
TP4	A - 5
TP5	C - 7
TP6	C - 5
TP7	H - 3
TP8	F - 3
TP9	H - 2
TP10	I - 2
TP11	J - 2
TP12	G - 3
TP13	I - 3
TP14	I - 3
TP15	G - 5
TP16	E - 5
TP17	F - 4
TP18	E - 5
TP19	E - 5
TP20	I - 5
TP21	J - 2
TP23	H - 7
TP24	G - 1
TP25	I- 1
TP26	E - 5
TP27	J - 5
TP28	A - 2
TP29	G - 3
TP30	F - 4
TP31	A - 4
TP32	G - 5
TP33	I - 4
TP34	B - 6
TP35	A - 6
TP36	G - 5
TP37	C - 3
TP38	B - 8
X1	E - 2

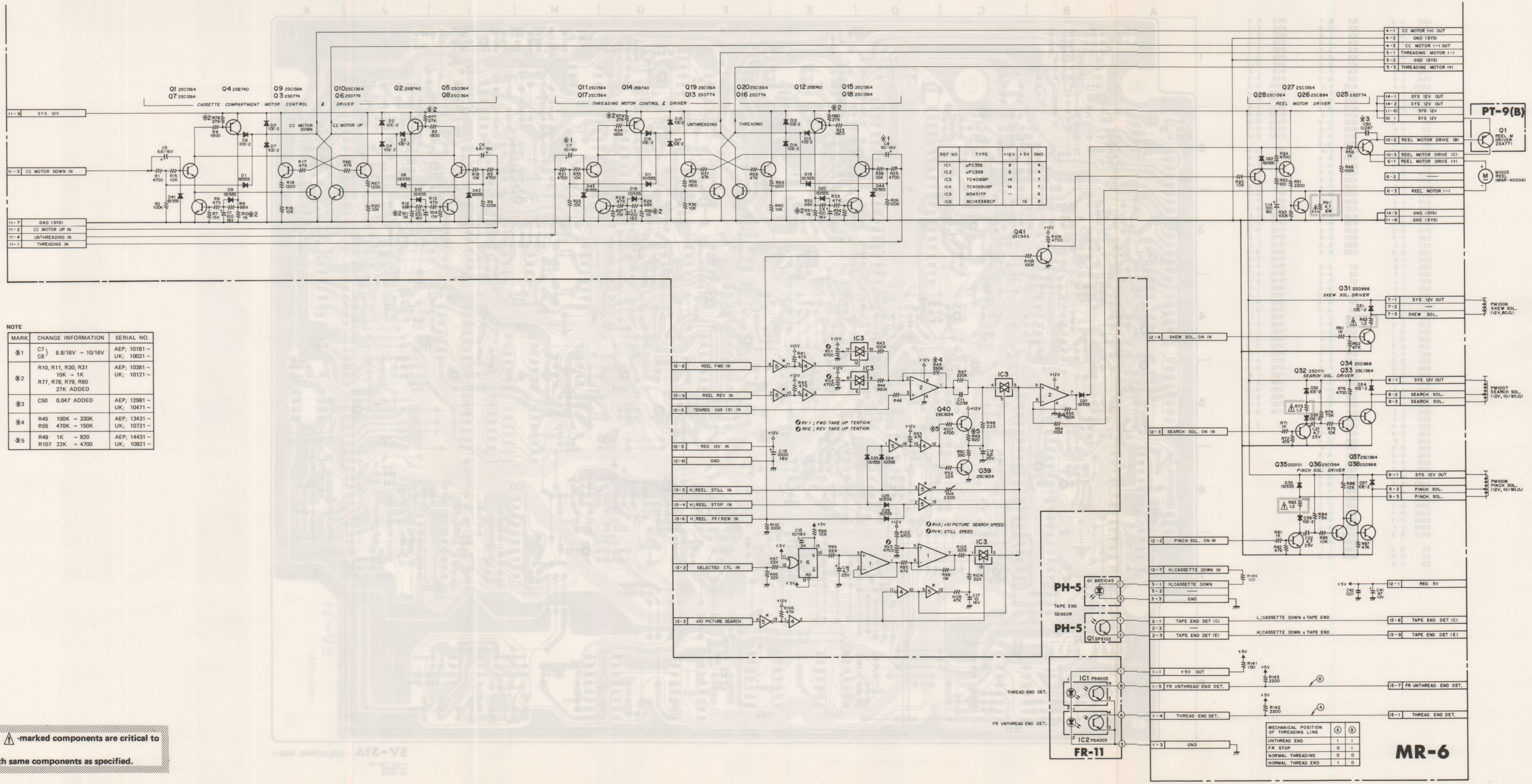

A
B
C
D
E
F
G
H
I
J
K
1
2
3
4
5
6
7
8
IC1
IC4
IC5
IC6
IC7
IC8
IC9
IC10
IC11
IC12
IC13
IC14
IC15
IC16
IC17
IC18
IC19
IC20
IC21
IC22
IC23
IC24
IC25
IC26
IC27
IC28
IC29
IC30
IC31
IC32
IC33
IC2
IC3
CN1
CN2
CN3
CN4
CN5
CN6
CN7
CN8
CN9
CN10
CN11
CN12
CN13
4.43MHz OSC
X1
E1
E2
E3
SV-31
1-603-738-

SV-31A -SOLDERING SIDE-

1-603-738-25
VO-5850P
VO-5850S

MR-6 (THREADING/CC MOTOR DRIVER/REEL MOTOR SERVO)

PT-9
FR-11
PH-5


CASSETTE COMPARTMENT MOTOR CONTROL & DRIVER
THREADING MOTOR CONTROL & DRIVER
REEL MOTOR DRIVER
11-9 SYS 12V
11-3 CC MOTOR DOWN IN
11-7 GND (SYS)
11-2 CC MOTOR UP IN
11-4 UNTHREADING IN
11-1 THREADING IN
CC MOTOR DOWN
C.C MOTOR UP
UNTHREADING
THREADING
4-1 CC MOTOR (+) OUT
4-2 GND (SYS)
4-3 CC MOTOR (−) OUT
5-1 THREADING MOTOR (−)
5-2 GND (SYS)
5-3 THREADING MOTOR (+)
14-1 SYS 12V OUT
14-2 SYS 12V OUT
11-10 SYS 12V
10 1 SYS 12V
10-2 REEL MOTOR DRIVE (B)
10-3 REEL MOTOR DRIVE (C)
6-1 REEL MOTOR DRIVE (+)
6-2 —
6-3 REEL MOTOR (−)
14-3 GND (SYS)
11-8 GND (SYS)
PT-9(B)
Q1 REEL M DRIVER 2SA771
M1003 REEL (MNR-4000A)
12-8 REEL FWD IN
12-9 REEL REV IN
12-6 TENREG CdS (S) IN
RV1 ; FWD TAKE UP TENTION
RV2 ; REV TAKE UP TENTION
12-5 REG 12V IN
12-10 GND
13-5 H;REEL STILL IN
13-4 H;REEL STOP IN
13-6 H;REEL FF/REW IN
RV3 ; x10 PICTURE SEARCH SPEED
RV4 ; STILL SPEED
13-2 SELECTED CTL IN
13-3 x10 PICTURE SEARCH
Q31 2SD998 SKEW SOL. DRIVER
7-1 SYS 12V OUT
7-2 —
7-3 SKEW SOL.
PM1006 SKEW SOL. (12V, 80Ω)
12-4 SKEW SOL. ON IN
Q32 2SD1111 Q33 2SC1364 Q34 2SD998 SEARCH SOL. DRIVER
8-1 SYS 12V OUT
8-2 SEARCH SOL.
8-3 SEARCH SOL.
PM1007 SEARCH SOL. (12V, 10/90Ω)
12-3 SEARCH SOL. ON IN
Q35 2SD1111 Q36 2SC1364 Q37 2SC1364 Q38 2SD998 PINCH SOL. DRIVER
9-1 SYS 12V OUT
9-2 PINCH SOL.
9-3 PINCH SOL.
PM1008 PINCH SOL. (12V, 10/90Ω)
12-2 PINCH SOL. ON IN
12-7 H;CASSETTE DOWN IN
12-1 REG 5V
PH-5
D1 BR5104S
3-1 H;CASSETTE DOWN
3-2 —
3-3 GND
TAPE END SENSOR
PH-5
Q1 SPS102
2-1 TAPE END DET (C)
2-2 —
2-3 TAPE END DET (E)
L;CASSETTE DOWN x TAPE END
H;CASSETTE DOWN x TAPE END
13-8 TAPE END DET (C)
13-9 TAPE END DET (E)
THREAD END DET.
FR UNTHREAD END DET.
IC1 PS4005
IC2 PS4005
FR-11
1-1 +5V OUT
1-5 FR UNTHREAD END DET.
1-4 THREAD END DET.
1-3 GND
13-7 FR UNTHREAD END DET.
13-1 THREAD END DET.
MR-6

REF NO	TYPE	+12V	+5V	GND
IC1	µPC358	8		4
IC2	µPC358	8		4
IC3	TC4016BP	14		7
IC4	TC4069UBP	14		7
IC5	M54517P	—		8
IC6	MC14538BCP		16	8

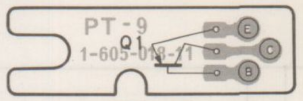
MECHANICAL POSITION OF THREADING LING	Ⓐ	Ⓑ
UNTHREAD END	1	1
FR STOP	0	1
NORMAL THREADING	0	0
NORMAL THREAD END	1	0

NOTE

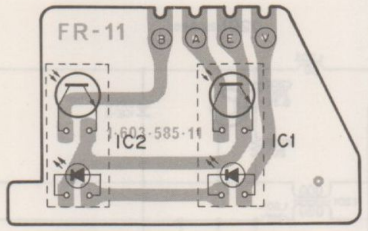
MARK	CHANGE INFORMATION	SERIAL NO.
※1	C7 C8) 6.8/16V → 10/16V	AEP; 10181 ~ UK; 10021 ~
※2	R10, R11, R30, R31 10K → 1K R77, R78, R79, R80 27K ADDED	AEP; 10381 ~ UK; 10121 ~
※3	C50 0.047 ADDED	AEP; 12981 ~ UK; 10471 ~
※4	R45 100K → 330K R55 470K → 150K	AEP; 13431 ~ UK; 10721 ~
※5	R49 1K → 820 R107 22K → 4700	AEP; 14431 ~ UK; 10921 ~

NOTE: The shaded and ⚠ -marked components are critical to safety.
Replace only with same components as specified.

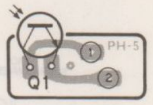
MR-6 (THREADING/CC MOTOR DRIVER/REEL MOTOR SERVO)
PT-9
FR-11
PH-5


PT-9
Q1
1-605-048-11
E
C
B

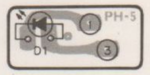
PT-9
-SOLDERING SIDE-


FR-11
B
A
E
V
IC2
IC1
1-603-585-11

FR-11 -SOLDERING SIDE-

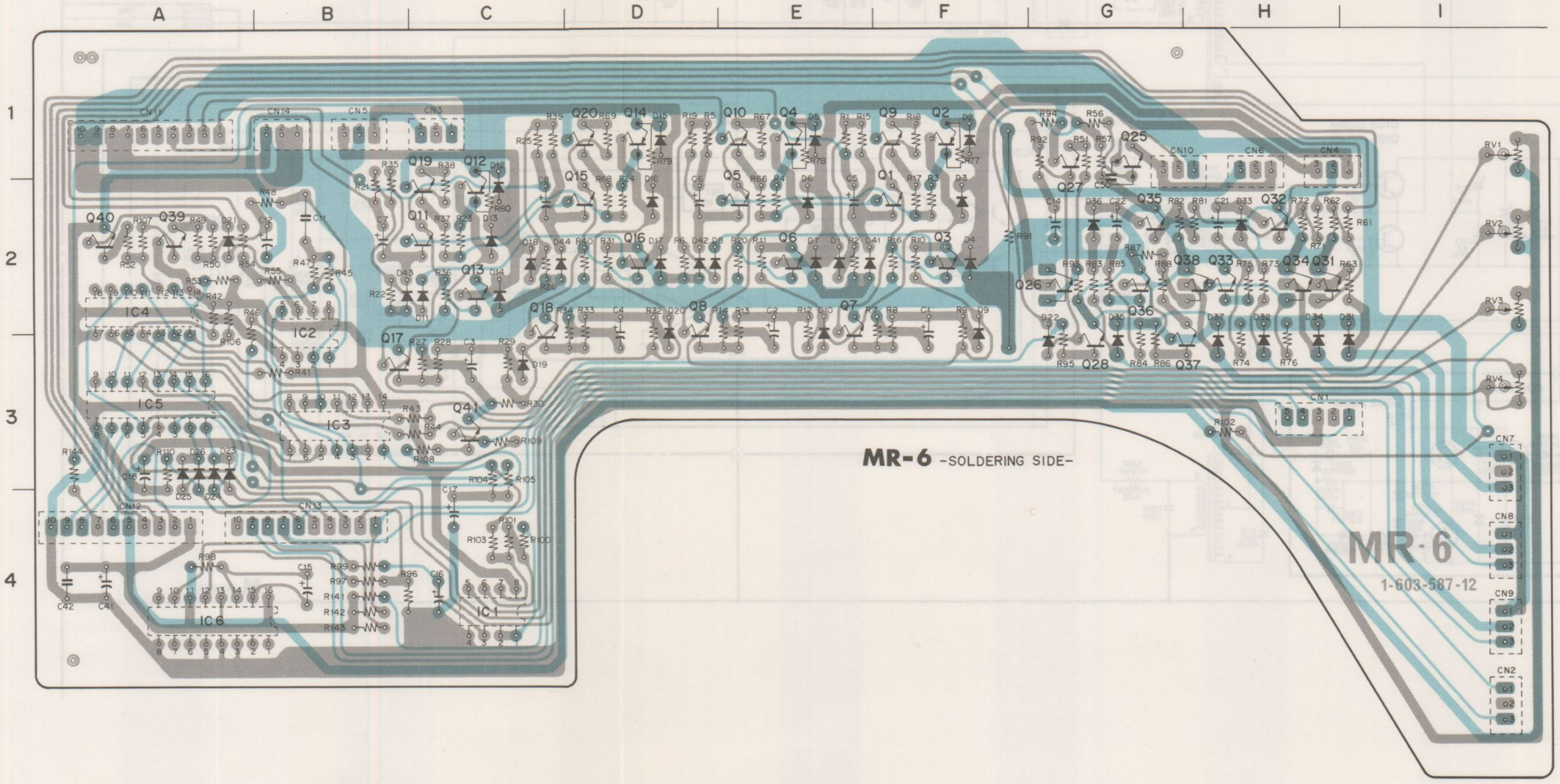


PH-5
-SOLDERING SIDE-



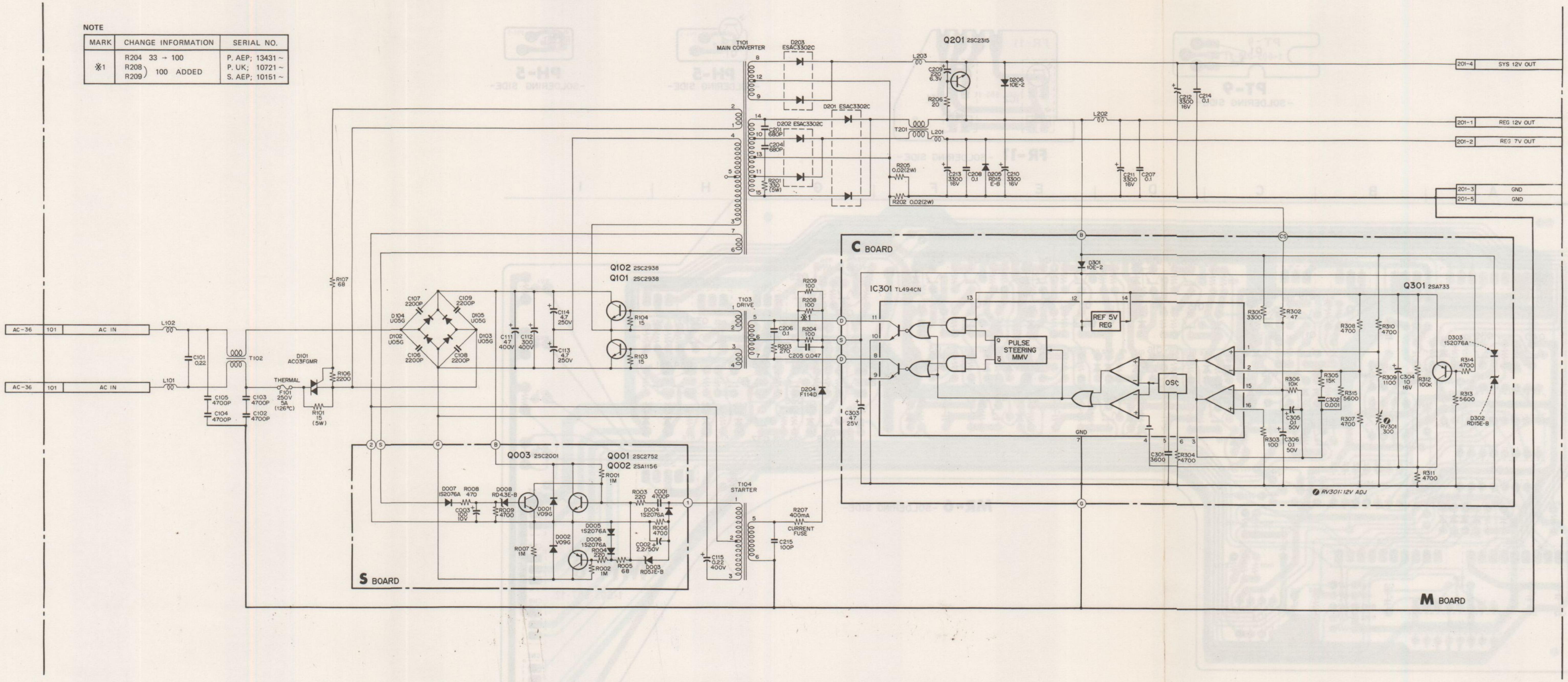
PH-5
-SOLDERING SIDE-

CN1	H-3	D21	A-2	Q12	C-2
CN2	I-4	D22	G-2	Q13	C-2
CN3	C-1	D23	A-3	Q14	D-1
CN4	H-1	D24	A-3	Q15	D-2
CN5	B-1	D25	A-3	Q16	D-2
CN6	H-1	D26	A-3	Q17	B-3
CN7	I-3	D31	I-2	Q18	C-2
CN8	I-4	D32	H-2	Q19	C-2
CN9	I-4	D33	H-2	Q20	D-1
CN10	H-1	D34	H-2	Q25	G-1
CN11	A-1	D35	G-2	Q26	G-2
CN12	A-4	D36	G-2	Q27	G-1
CN13	B-4	D37	H-2	Q28	G-2
CN14	B-1	D41	E-2	Q31	H-2
		D42	D-2	Q32	H-2
D1	E-2	D43	B-2	Q33	H-2
D2	F-1	D44	C-2	Q34	H-2
D3	F-2			Q35	G-2
D4	F-2	IC1	C-4	Q36	G-2
D5	E-1	IC2	B-2	Q37	H-2
D6	E-2	IC3	B-3	Q38	H-2
D7	E-2	IC4	A-2	Q39	A-2
D8	D-2	IC5	A-3	Q40	A-2
D9	F-2			Q41	C-3
D10	E-2	Q1	F-1		
D11	C-2	Q2	F-1	RV1	I-1
D12	C-2	Q3	F-2	RV2	I-2
D13	C-2	Q4	E-1	RV3	I-2
D14	C-2	Q5	E-2	RV4	I-3
D15	D-1	Q6	E-2		
D16	D-2	Q7	E-2		
D17	D-2	Q8	D-2		
D18	C-2	Q9	F-1		
D19	C-3	Q10	E-1		
D20	D-2	Q11	C-2		


A
B
C
D
E
F
G
H
I
1
2
3
4
CN11
CN14
CN5
CN3
CN10
CN6
CN4
CN1
CN12
CN13
CN7
CN8
CN9
CN2
IC1
IC2
IC3
IC4
IC5
IC6
RV1
RV2
RV3
RV4
MR-6
1-603-587-12

MR-6 -SOLDERING SIDE-

UR-02 (SWITCHING REGULATOR)

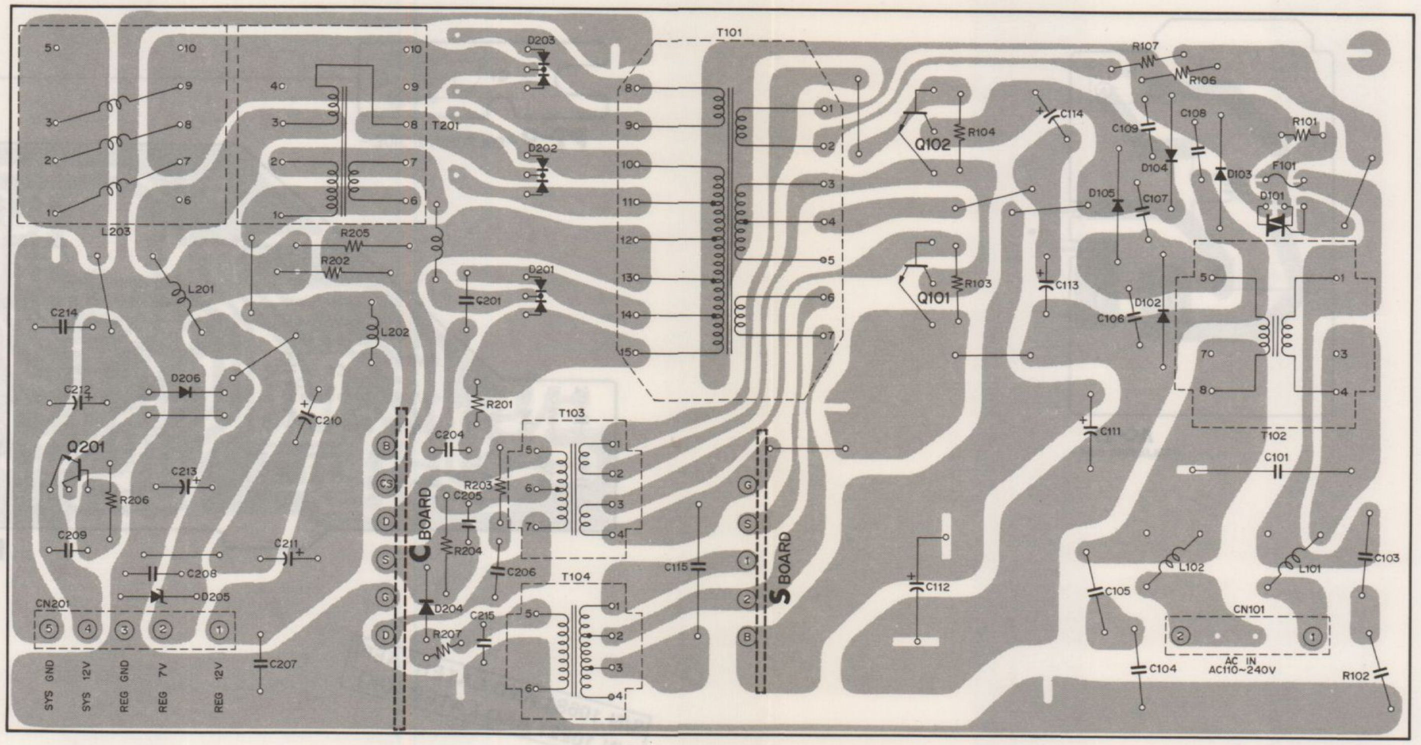

AC-36
101
AC IN
L102
L101
C101 0.22
T102
C105 4700P
C104 4700P
C103 4700P
C102 4700P
THERMAL
F101 250V 5A (126°C)
D101 AC03FGMR
R101 15 (5W)
R106 2200
R107 68
C107 2200P
C109 2200P
D104 U05G
D105 U05G
D102 U05G
D103 U05G
C106 2200P
C108 2200P
C111 47 400V
C112 300 400V
C114 4.7 250V
C113 4.7 250V
Q102 2SC2938
Q101 2SC2938
R104 15
R103 15
T101 MAIN CONVERTER
D203 ESAC3302C
D202 ESAC3302C
D201 ESAC3302C
C201 680P
C204 680P
R201 330 (5W)
T103 DRIVE
C206 0.1
R203 270
C205 0.047
R209 100
R208 100
※1
R204 100
D204 F114D
C303 47 25V
Q201 2SC2315
L203
C209 220 6.3V
R206 20
D206 10E-2
T201
L201
R205 0.02(2W)
R202 0.02(2W)
C213 3300 16V
C208 0.1
D205 RD15 E-B
C210 3300 16V
L202
C211 3300 16V
C207 0.1
C212 3300 16V
C214 0.1
201-4 SYS 12V OUT
201-1 REG 12V OUT
201-2 REG 7V OUT
201-3 GND
201-5 GND
C BOARD
IC301 TL494CN
PULSE STEERING MMV
Q
Q̄
REF 5V REG
OSC
GND
D301 10E-2
B
CS
R301 3300
R302 47
R306 10K
R305 15K
R315 5600
C302 0.001
C305 0.1 50V
C306 0.1 50V
R303 100
C301 3600
R304 4700
Q301 2SA733
R308 4700
R310 4700
R309 1100
C304 10 16V
R312 100K
R307 4700
RV301 300
R311 4700
D303 1S2076A
R314 4700
R313 5600
D302 RD15E-B
RV301: 12V ADJ
M BOARD
S BOARD
2
S
G
D
Q003 2SC2001
Q001 2SC2752
Q002 2SA1156
R001 1M
D007 1S2076A
R008 470
C003 100 10V
D008 RD4.3E-B
R009 4700
D001 V09G
D002 V09G
R007 1M
R003 220
C001 4700P
D004 1S2076A
R006 4700
D005 1S2076A
D006 1S2076A
R004 220
C002 2.2/50V
R002 1M
R005 68
D003 RD5.1E-B
T104 STARTER
C115 0.22 400V
R207 400mA CURRENT FUSE
C215 100P

NOTE

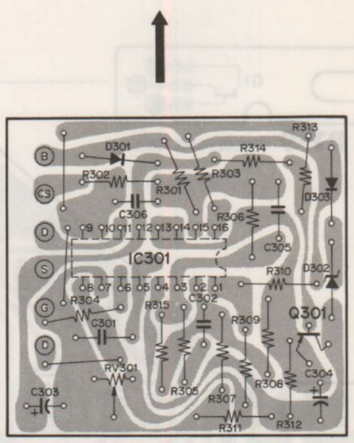
MARK	CHANGE INFORMATION	SERIAL NO.
※1	R204 33 → 100 R208, R209 100 ADDED	P. AEP; 13431 ~ P. UK; 10721 ~ S. AEP; 10151 ~

NOTE: The shaded and ⚠ -marked components are critical to safety.
Replace only with same components as specified.

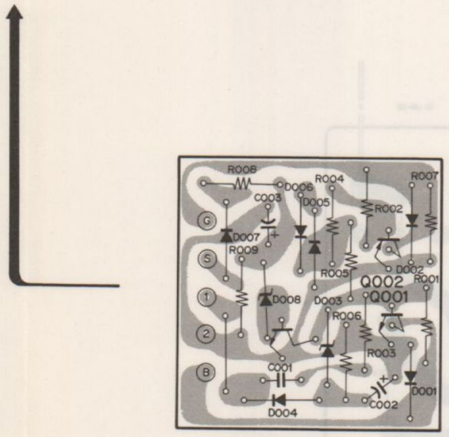
UR-02 (SWITCHING REGULATOR)


T101
T201
T102
T103
T104
L201
L202
L203
L101
L102
Q101
Q102
Q201
D101
D102
D103
D104
D105
D201
D202
D203
D204
D205
D206
F101
R101
R102
R103
R104
R106
R107
R201
R202
R203
R204
R205
R206
R207
C101
C103
C104
C105
C106
C107
C108
C109
C111
C112
C113
C114
C115
C201
C204
C205
C206
C207
C208
C209
C210
C211
C212
C213
C214
C215
CN101
AC IN
AC110~240V
CN201
SYS GND
SYS 12V
REG GND
REG 7V
REG 12V
C BOARD
S BOARD

M -SOLDERING SIDE-


IC301
Q301
D301
D302
D303
R301
R302
R303
R304
R305
R306
R307
R308
R309
R310
R311
R312
R313
R314
R315
RV301
C301
C302
C303
C304
C305
C306

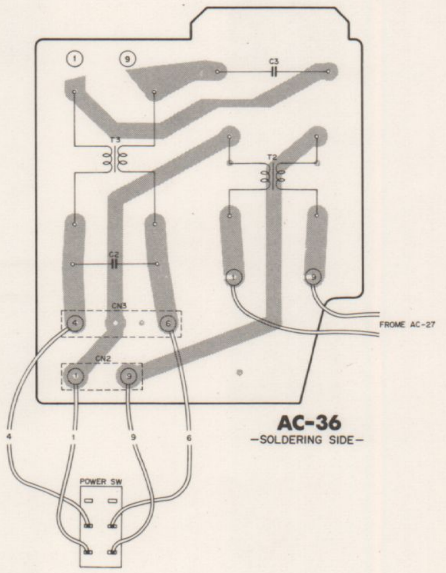
C -SOLDERING SIDE-


Q001
Q002
D001
D002
D003
D004
D005
D006
D007
D008
R001
R002
R003
R004
R005
R006
R007
R008
R009
C001
C002
C003

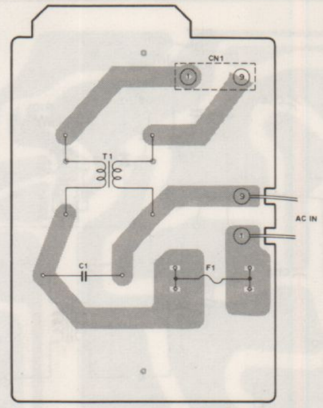
S -SOLDERING SIDE-

AC-27 (AC INPUT)
AC-36

S/N UP TO 17010 (AEP)
S/N UP TO 11350 (UK)


T1
T2
C3
C2
CN3
CN2
FROME AC-27
POWER SW
4
1
9
6

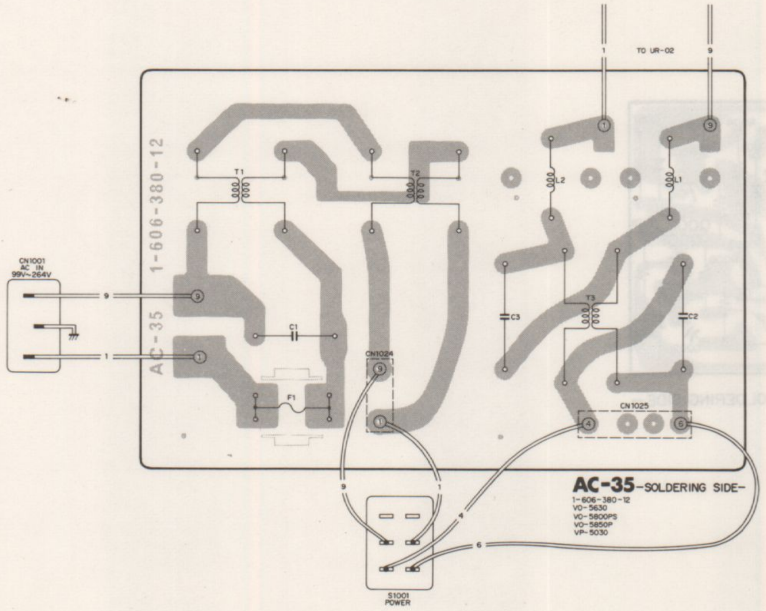
AC-36 -SOLDERING SIDE-


CN1
T1
C1
C2
F1
AC IN

AC-27 -SOLDERING SIDE-

AC-35 (AC INPUT)

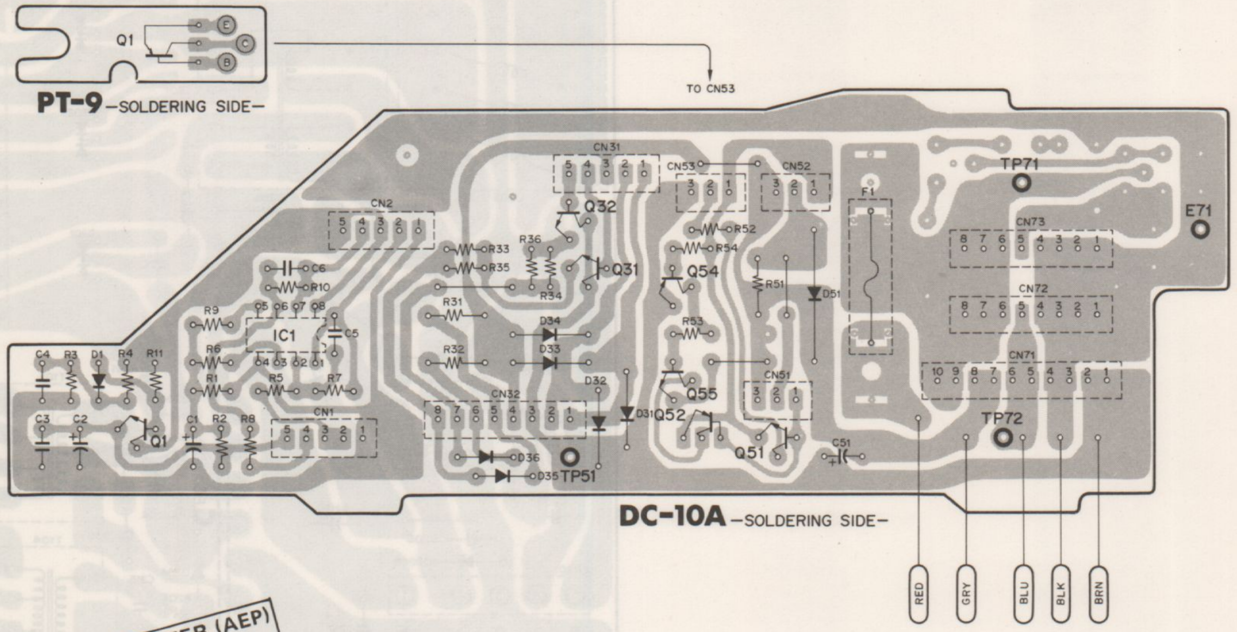
S/N 17011 AND LATER (AEP)
S/N 11351 AND LATER (UK)


TO UR-02
1
9
CN1001
AC IN
99V~264V
1-606-380-12
AC-35
T1
T2
T3
L1
L2
C1
C2
C3
F1
CN1024
CN1025
4
6
S1001
POWER

AC-35 -SOLDERING SIDE-
1-606-380-12
VO-5630
VO-5800PS
VO-5850P
VP-5030

DC-10A (DRUM/CAPSTAN MOTOR DRIVER)
PT-9

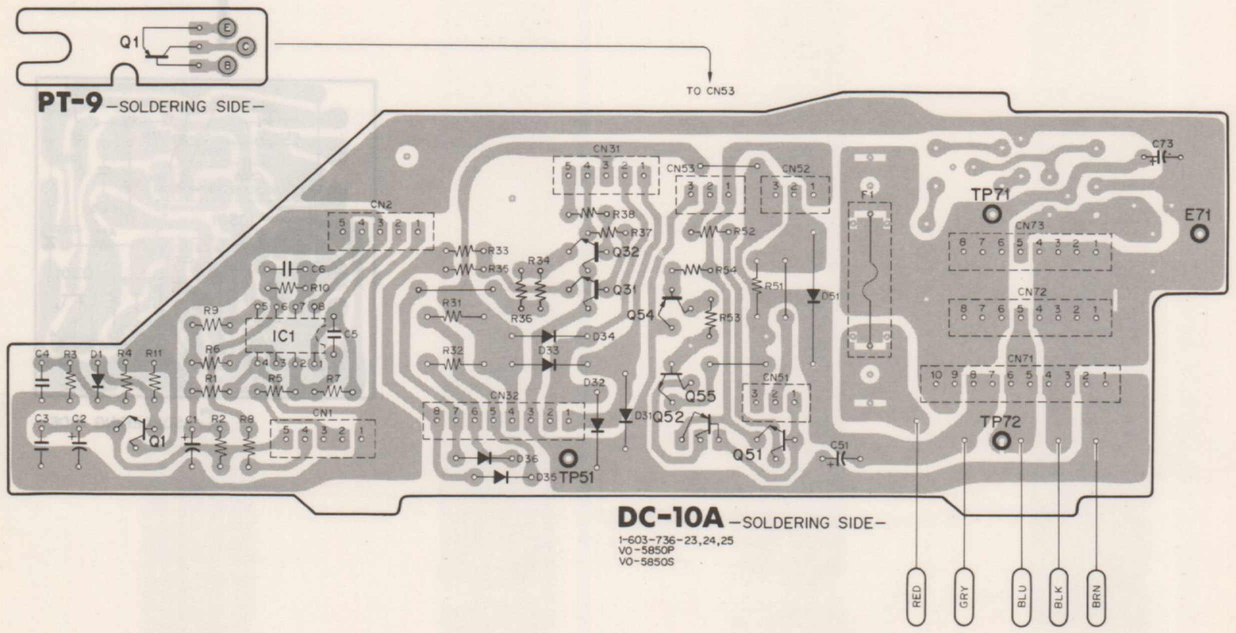
S/N UP TO 10680 (AEP)
S/N UP TO 10220 (UK)


Q1
E
C
B
TO CN53
CN31
CN53
CN52
CN2
CN73
CN72
CN71
CN32
CN51
CN1
IC1
TP71
TP72
TP51
E71
F1
Q31
Q32
Q51
Q52
Q54
Q55
D31
D32
D33
D34
D35
D36
D51
C51
RED
GRY
BLU
BLK
BRN

PT-9 -SOLDERING SIDE-

DC-10A -SOLDERING SIDE-

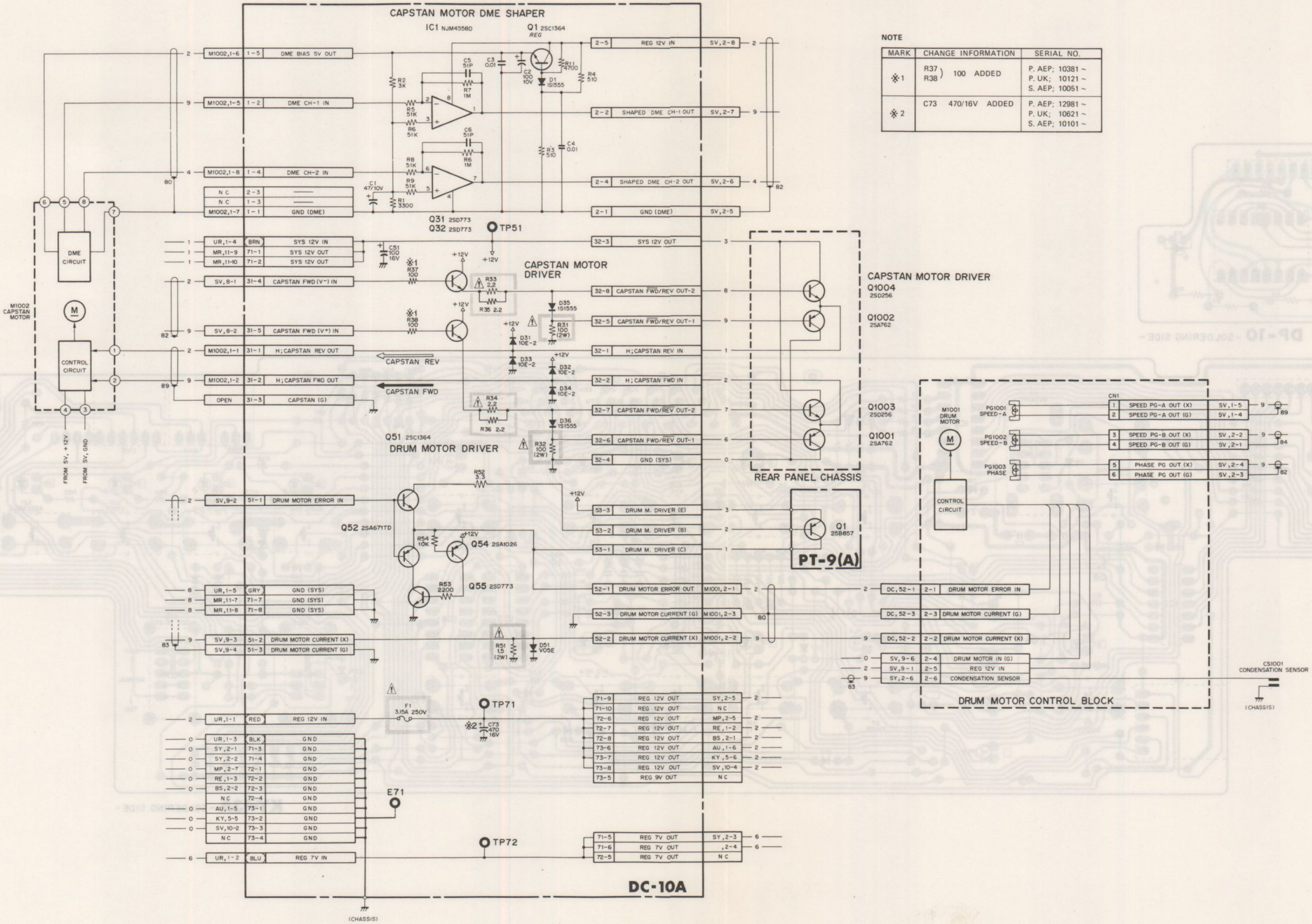
S/N 10681 AND LATER (AEP)
S/N 10221 AND LATER (UK)


Q1
E
C
B
TO CN53
CN31
CN53
CN52
CN2
CN73
CN72
CN71
CN32
CN51
CN1
IC1
TP71
TP72
TP51
E71
F1
C73
Q31
Q32
Q51
Q52
Q54
Q55
D31
D32
D33
D34
D35
D36
D51
C51
RED
GRY
BLU
BLK
BRN

PT-9 -SOLDERING SIDE-

DC-10A -SOLDERING SIDE-
1-603-736-23,24,25
VO-5850P
VO-5850S

DC-10A (DRUM/CAPSTAN MOTOR DRIVER)
PT-9


CAPSTAN MOTOR DME SHAPER
IC1 NJM4558D
Q1 2SC1364 REG
DME BIAS 5V OUT
DME CH-1 IN
DME CH-2 IN
GND (DME)
REG 12V IN
SHAPED DME CH-1 OUT
SHAPED DME CH-2 OUT
Q31 2SD773
Q32 2SD773
TP51
SYS 12V IN
SYS 12V OUT
SYS 12V OUT
CAPSTAN MOTOR DRIVER
CAPSTAN FWD (V−) IN
CAPSTAN FWD (V+) IN
H; CAPSTAN REV OUT
H; CAPSTAN FWD OUT
CAPSTAN (G)
CAPSTAN REV
CAPSTAN FWD
CAPSTAN FWD/REV OUT-2
CAPSTAN FWD/REV OUT-1
H; CAPSTAN REV IN
H; CAPSTAN FWD IN
GND (SYS)
DME CIRCUIT
CONTROL CIRCUIT
M1002 CAPSTAN MOTOR
FROM SV, +12V
FROM SV, GND
CAPSTAN MOTOR DRIVER
Q1004 2SD256
Q1002 2SA762
Q1003 2SD256
Q1001 2SA762
REAR PANEL CHASSIS
Q1 2SB857
PT-9(A)
Q51 2SC1364
DRUM MOTOR DRIVER
DRUM MOTOR ERROR IN
DRUM M. DRIVER (E)
DRUM M. DRIVER (B)
DRUM M. DRIVER (C)
Q52 2SA671TD
Q54 2SA1026
Q55 2SD773
DRUM MOTOR ERROR OUT
DRUM MOTOR CURRENT (G)
DRUM MOTOR CURRENT (X)
F1 3.15A 250V
TP71
REG 12V IN
GND
REG 12V OUT
REG 9V OUT
E71
TP72
REG 7V IN
REG 7V OUT
DC-10A
(CHASSIS)
M1001 DRUM MOTOR
PG1001 SPEED-A
PG1002 SPEED-B
PG1003 PHASE
CN1
SPEED PG-A OUT (X)
SPEED PG-A OUT (G)
SPEED PG-B OUT (X)
SPEED PG-B OUT (G)
PHASE PG OUT (X)
PHASE PG OUT (G)
DRUM MOTOR IN (G)
REG 12V IN
CONDENSATION SENSOR
CS1001 CONDENSATION SENSOR
DRUM MOTOR CONTROL BLOCK

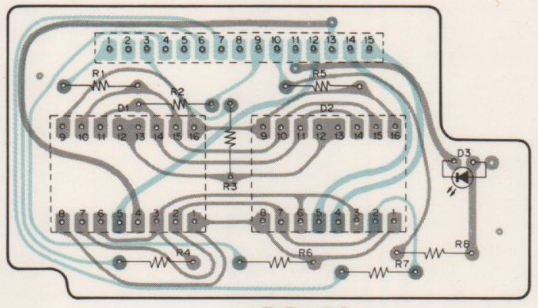
NOTE

MARK	CHANGE INFORMATION	SERIAL NO.
※1	R37, R38 100 ADDED	P. AEP; 10381 ~ P. UK; 10121 ~ S. AEP; 10051 ~
※2	C73 470/16V ADDED	P. AEP; 12981 ~ P. UK; 10621 ~ S. AEP; 10101 ~

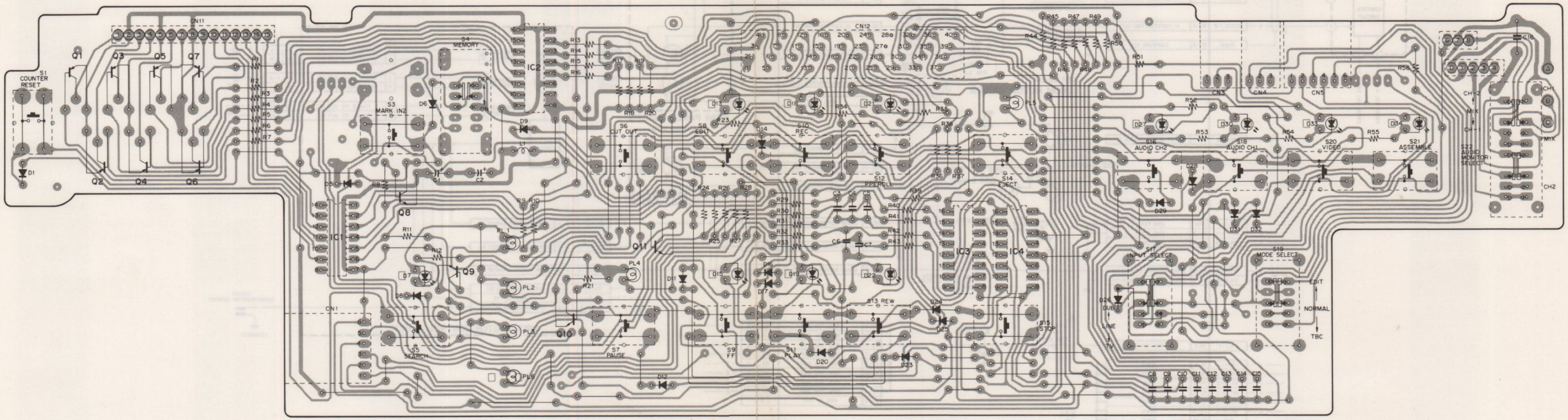
NOTE: **The shaded and ⚠-marked components are critical to safety. Replace only with same components as specified.**

KY-13A (FUNCTION KEY BOARD)
DP-10

UP TO 11080 (AEP)
UP TO 10320 (UK)

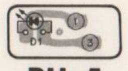

R1
R2
R3
R4
R5
R6
R7
R8
D1
D2
D3

DP-10 -SOLDERING SIDE-

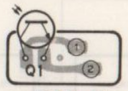

CN11
S1 COUNTER RESET
Q1
Q2
Q3
Q4
Q5
Q6
Q7
D1
S4 MEMORY
S3 MARK IN2
IC1
IC2
Q8
Q9
Q10
Q11
S6 CUT OUT
S5 SEARCH
S7 PAUSE
PL1
PL2
PL3
PL4
PL5
CN1
S8 EDIT
S10 REC
S12 PREROLL
S9 FF
S11 PLAY
S13 REW
CN12
IC3
IC4
S14 EJECT
S15 STOP
CN3
CN4
CN5
S16 AUDIO CH2
S18 AUDIO CH1
S20 VIDEO
S21 ASSEMBLE
S22 AUDIO MONITOR SELECT
CH1
CH2
MIX
S17 INPUT SELECT
DUB
LINE
TV
S19 MODE SELECT
EDIT
NORMAL
TBC

KY-13A -SOLDERING SIDE-

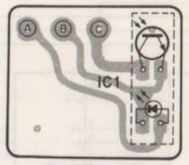
ML-1
PH-5
LM-7
SW-46
SW-50



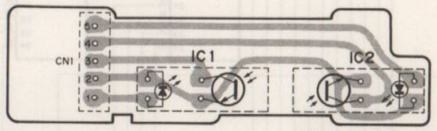
PH-5 —SOLDERING SIDE—



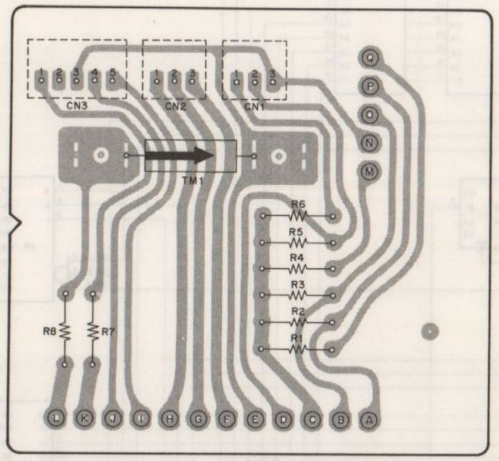
PH-5 —SOLDERING SIDE—



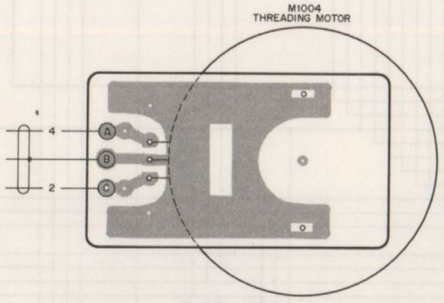
SW-50 —SOLDERING SIDE—



SW-46 —SOLDERING SIDE—

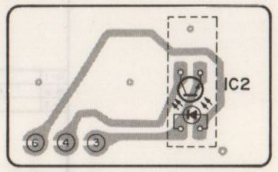

CN3
CN2
CN1
TM1
R6
R5
R4
R3
R2
R1
R8
R7
L
K
J
I
H
G
F
E
D
C
B
A
Q
P
O
N
M

ML-1 —SOLDERING SIDE—

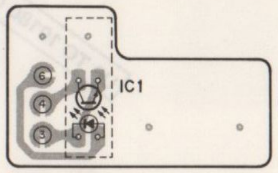

M1004
THREADING MOTOR
4
3
2
A
B
C

LM-7 —SOLDERING SIDE—

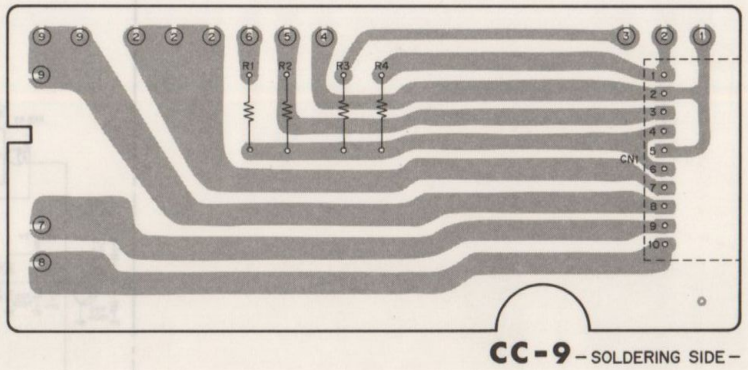
CC-9
CC-10
CC-11



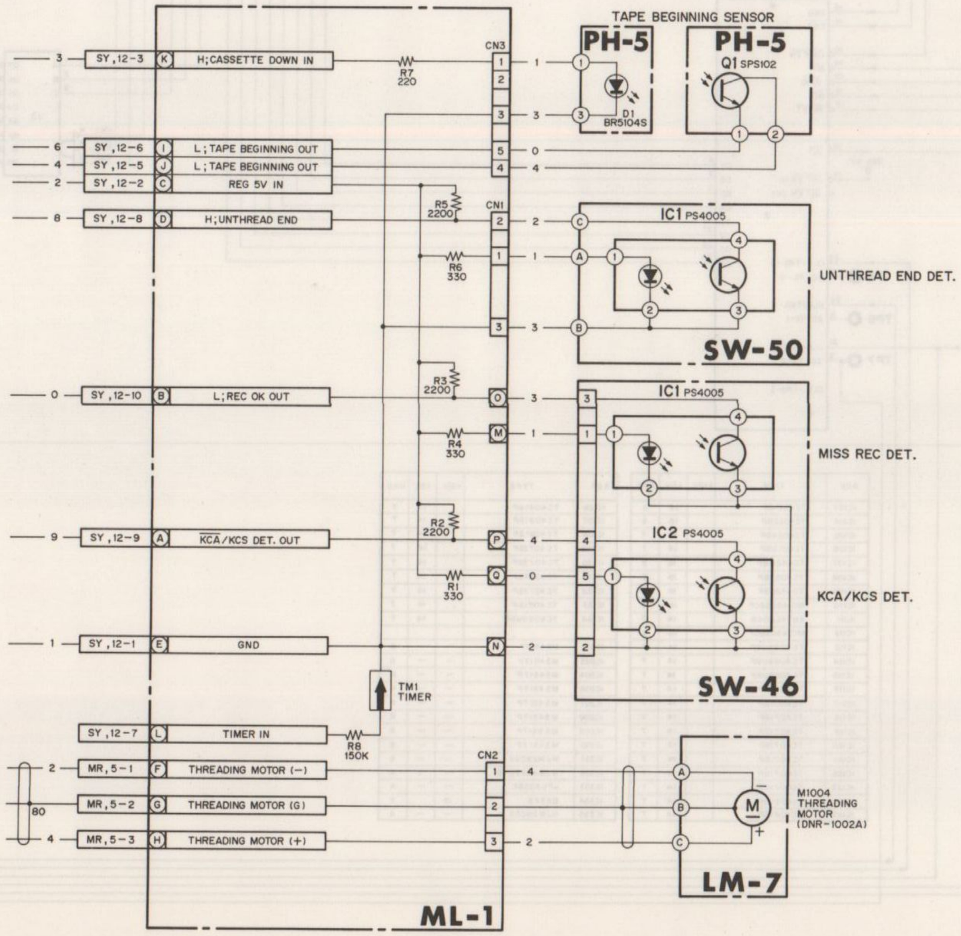
CC-11 —SOLDERING SIDE—

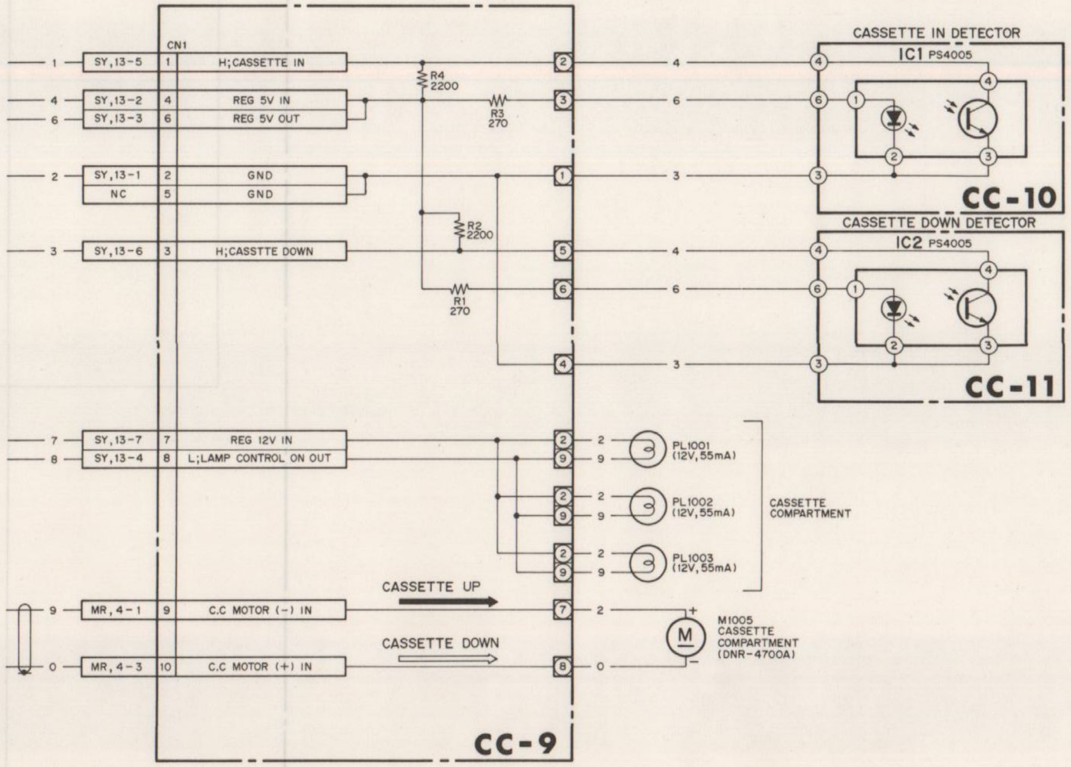


CC-10 —SOLDERING SIDE—


R1
R2
R3
R4
CN1

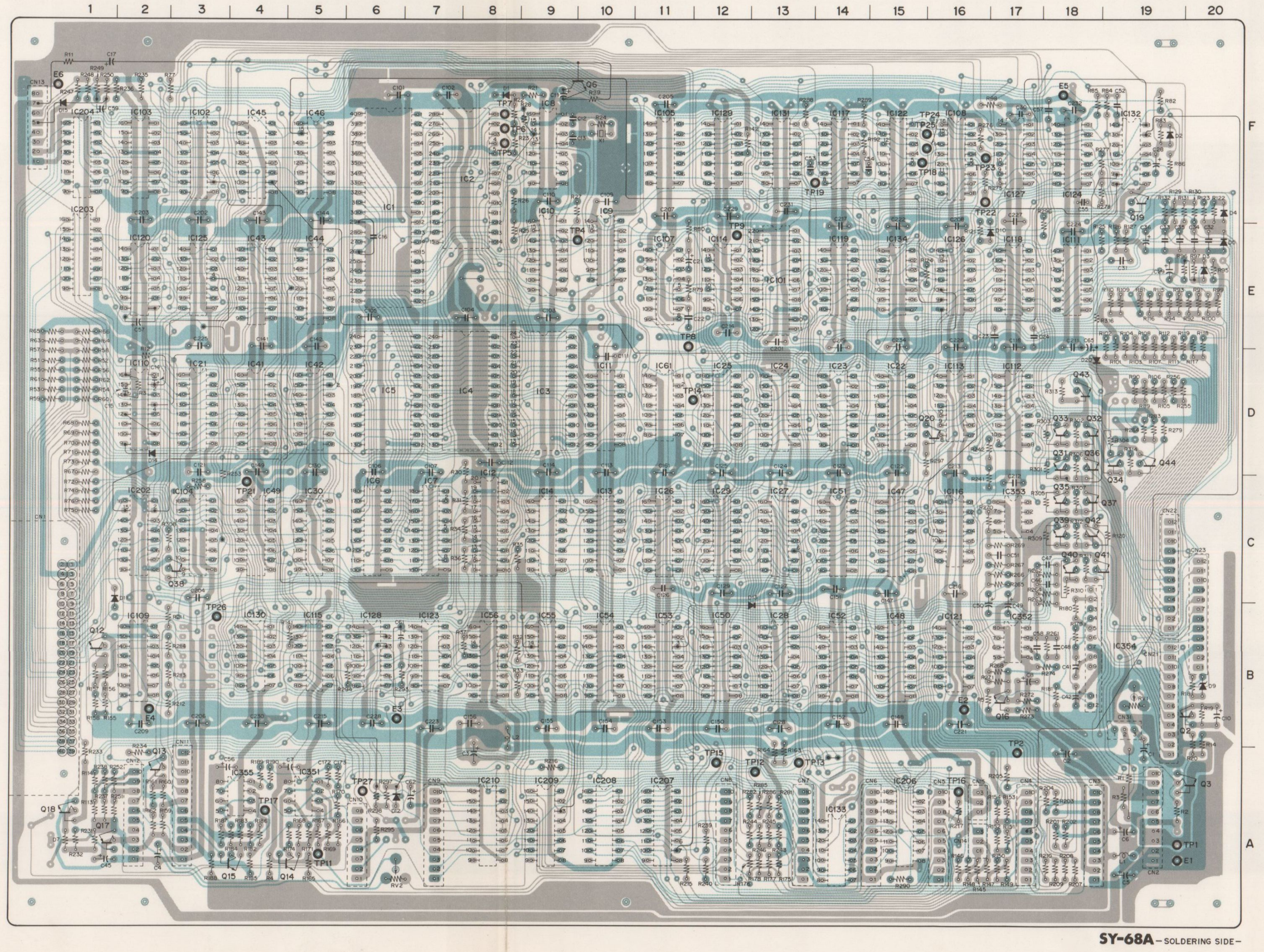
CC-9 —SOLDERING SIDE—


TAPE BEGINNING SENSOR
PH-5
PH-5
D1
BR5104S
Q1 SPS102
3
SY ,12-3
K
H;CASSETTE DOWN IN
R7
220
CN3
6
SY ,12-6
I
L;TAPE BEGINNING OUT
4
SY ,12-5
J
L;TAPE BEGINNING OUT
2
SY ,12-2
C
REG 5V IN
8
SY ,12-8
D
H;UNTHREAD END
R5
2200
CN1
R6
330
IC1 PS4005
UNTHREAD END DET.
SW-50
0
SY ,12-10
B
L;REC OK OUT
R3
2200
R4
330
IC1 PS4005
MISS REC DET.
9
SY ,12-9
A
KCA/KCS DET. OUT
R2
2200
R1
330
IC2 PS4005
KCA/KCS DET.
1
SY ,12-1
E
GND
TM1
TIMER
SW-46
SY ,12-7
L
TIMER IN
R8
150K
CN2
2
MR, 5-1
F
THREADING MOTOR (−)
80
MR, 5-2
G
THREADING MOTOR (G)
4
MR, 5-3
H
THREADING MOTOR (+)
M1004
THREADING
MOTOR
(DNR-1002A)
LM-7
ML-1


CN1
1
SY,13-5
H;CASSETTE IN
4
SY,13-2
REG 5V IN
6
SY,13-3
REG 5V OUT
2
SY,13-1
GND
NC
5
GND
3
SY,13-6
H;CASSTTE DOWN
R4
2200
R3
270
R2
2200
R1
270
CASSETTE IN DETECTOR
IC1 PS4005
CC-10
CASSETTE DOWN DETECTOR
IC2 PS4005
CC-11
7
SY,13-7
REG 12V IN
8
SY,13-4
L;LAMP CONTROL ON OUT
PL1001
(12V,55mA)
PL1002
(12V,55mA)
PL1003
(12V,55mA)
CASSETTE
COMPARTMENT
CASSETTE UP
CASSETTE DOWN
9
MR, 4-1
C.C MOTOR (−) IN
0
MR, 4-3
10
C.C MOTOR (+) IN
M1005
CASSETTE
COMPARTMENT
(DNR-4700A)
CC-9

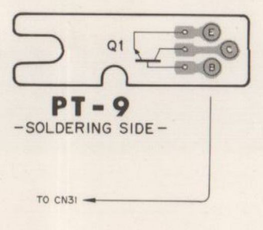
SY-68A (SYSTEM CONTROL)
PT-9

UP TO 10180 (AEP)



SY-68A -SOLDERING SIDE-

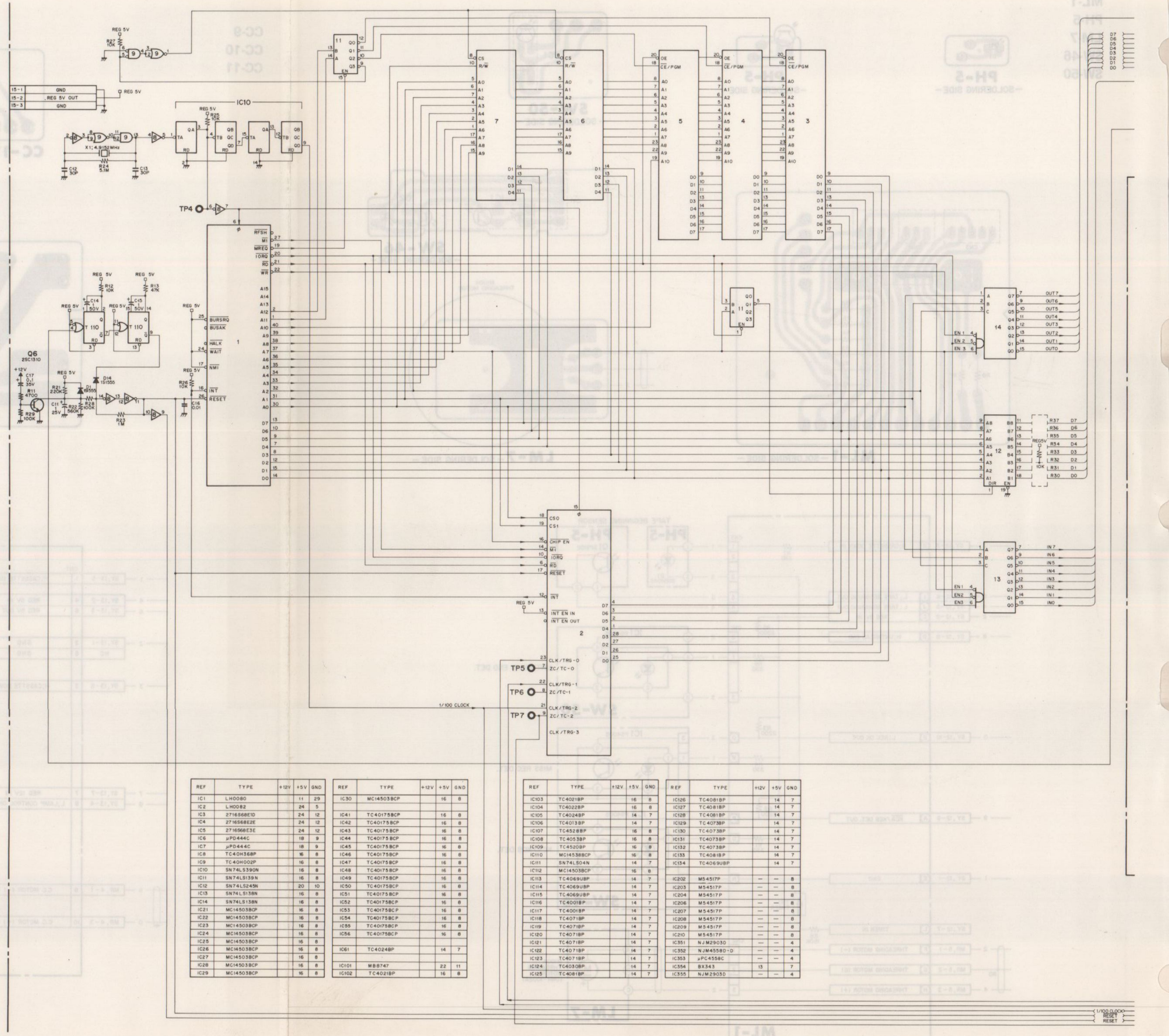
CN1	B - 1	IC30	C - 5	Q2	B - 20
CN2	A - 19	IC41	D - 4	Q3	A - 20
CN3	A - 18	IC42	D - 5	Q6	F - 9
CN4	A - 17	IC43	E - 4	Q12	B - 1
CN5	A - 16	IC44	E - 5	Q13	A - 2
CN6	A - 15	IC45	F - 4	Q14	A - 4
CN7	A - 13	IC46	F - 5	Q15	A - 3
CN8	A - 12	IC47	C - 15	Q16	B - 17
CN9	A - 7	IC48	B - 15	Q17	A - 1
CN10	A - 6	IC49	C - 4	Q18	A - 1
CN11	A - 3	IC50	B - 12	Q19	F - 19
CN12	A - 2	IC51	C - 14	Q20	D - 16
CN13	F - 1	IC52	B - 14	Q31	D - 18
CN14	A - 16	IC53	B - 11	Q32	D - 18
CN21	B - 19	IC54	B - 10	Q33	D - 18
CN22	C - 19	IC55	B - 9	Q34	D - 19
CN23	B - 20	IC56	B - 8	Q35	C - 18
CN31	B - 19	IC61	D - 11	Q36	D - 18
		IC101	E - 13	Q37	C - 18
D1	F - 8	IC102	F - 3	Q38	C - 3
D2	F - 19	IC103	F - 2	Q39	C - 18
D3	E - 20	IC104	C - 3	Q40	C - 18
D4	F - 20	IC105	F - 11	Q41	C - 19
D5	E - 20	IC107	E - 11	Q42	C - 18
D7	A - 1	IC108	F - 16	Q43	D - 18
D9	B - 20	IC109	B - 2	Q44	D - 19
D10	E - 17	IC110	D - 2		
D11	B - 2	IC111	E - 18	RV1	B - 19
D12	A - 6	IC112	D - 17	RV2	A - 6
D13	B - 12	IC113	D - 16		
D14	D - 2	IC114	E - 12	TP1	A - 19
D15	F - 1	IC115	B - 5	TP2	A - 17
D20	E - 18	IC116	C - 16	TP4	E - 9
		IC117	F - 14	TP5	F - 8
E1	A - 19	IC118	E - 17	TP8	E - 11
E2	B - 16	IC119	E - 14	TP9	E - 12
E3	B - 6	IC120	E - 2	TP11	A - 5
E4	B - 2	IC121	B - 16	TP12	A - 13
E5	F - 18	IC122	F - 15	TP13	A - 13
E6	F - 6	IC123	B - 7	TP14	D - 11
		IC124	F - 18	TP15	A - 13
IC1	F - 6	IC125	E - 3	TP16	A - 16
IC2	F - 8	IC126	E - 16	TP17	A - 4
IC3	D - 9	IC127	F - 17	TP18	F - 15
IC4	D - 8	IC128	B - 6	TP19	F - 13
IC5	D - 6	IC129	F - 12	TP21	C - 4
IC6	C - 6	IC130	B - 4	TP22	F - 16
IC7	C - 7	IC131	F - 13	TP23	F - 16
IC8	F - 9	IC132	F - 19	TP24	F - 16
IC9	E - 10	IC133	A - 14	TP25	F - 15
IC10	E - 9	IC134	E - 15	TP26	B - 3
IC11	D - 10	IC202	C - 2	TP27	A - 6
IC12	C - 8	IC203	E - 1		
IC13	C - 10	IC204	F - 1	X1	F - 10
IC14	C - 9	IC206	A - 15		
IC21	D - 3	IC207	A - 11		
IC22	D - 15	IC208	A - 10		
IC23	D - 14	IC209	A - 9		
IC24	D - 13	IC210	A - 8		
IC25	D - 12	IC351	A - 5		
IC26	C - 11	IC352	B - 17		
IC27	C - 13	IC353	C - 17		
IC28	B - 13	IC354	B - 18		
IC29	C - 12	IC355	A - 4		



PT-9
-SOLDERING SIDE-

SY-68A (SYSTEM CONTROL)
PT-9

UP TO 10180 (AEP)

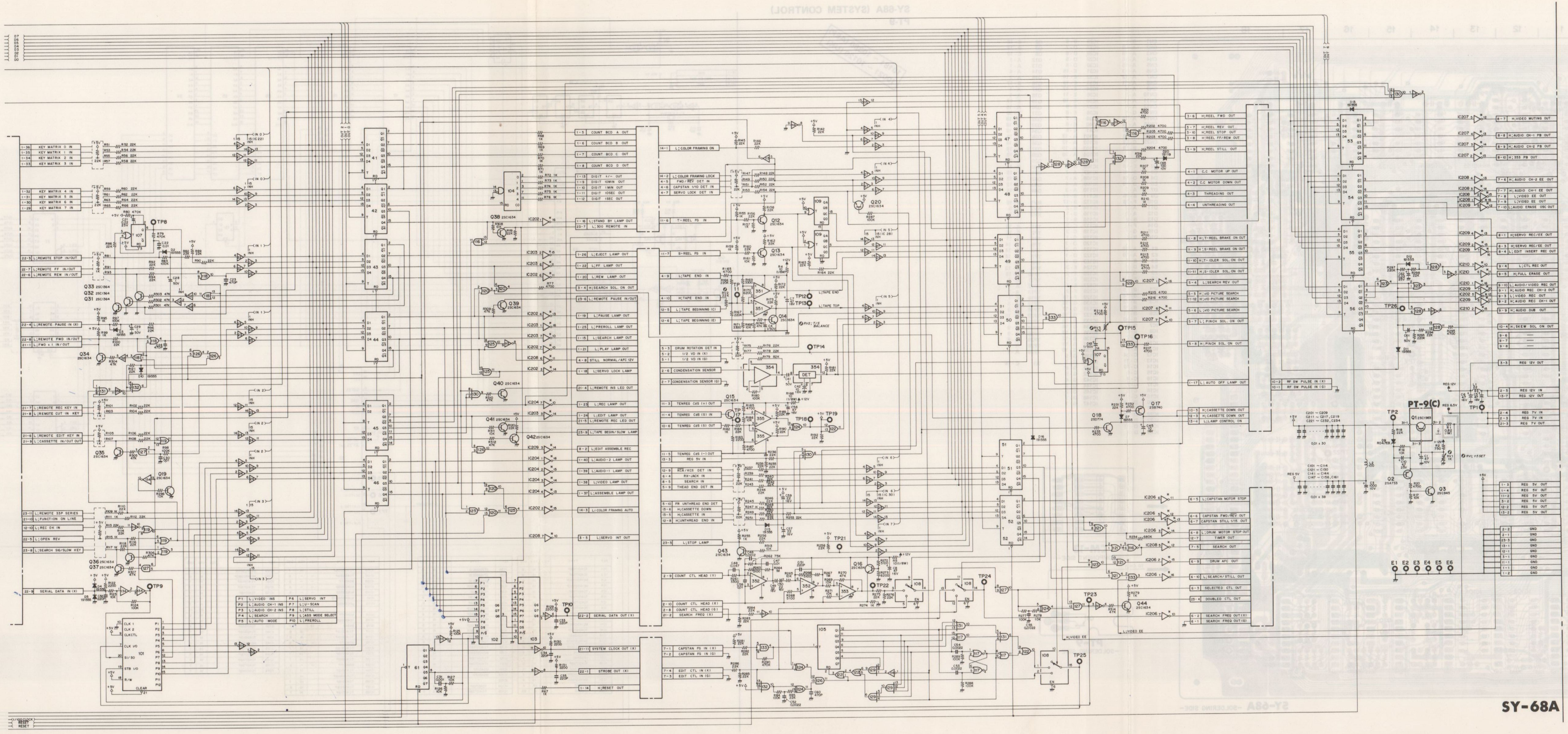


REF	TYPE	+12V	+5V	GND
IC1	LH0080		11	29
IC2	LH0082		24	5
IC3	2716S68E1D		24	12
IC4	2716S68E2E		24	12
IC5	2716S68E3E		24	12
IC6	μPD444C		18	9
IC7	μPD444C		18	9
IC8	TC40H368P		16	8
IC9	TC40H002P		16	8
IC10	SN74LS390N		16	8
IC11	SN74LS139N		16	8
IC12	SN74LS245N		20	10
IC13	SN74LS138N		16	8
IC14	SN74LS138N		16	8
IC21	MC14503BCP		16	8
IC22	MC14503BCP		16	8
IC23	MC14503BCP		16	8
IC24	MC14503BCP		16	8
IC25	MC14503BCP		16	8
IC26	MC14503BCP		16	8
IC27	MC14503BCP		16	8
IC28	MC14503BCP		16	8
IC29	MC14503BCP		16	8

REF	TYPE	+12V	+5V	GND
IC30	MC14503BCP		16	8
IC41	TC40175BCP		16	8
IC42	TC40175BCP		16	8
IC43	TC40175BCP		16	8
IC44	TC40175BCP		16	8
IC45	TC40175BCP		16	8
IC46	TC40175BCP		16	8
IC47	TC40175BCP		16	8
IC48	TC40175BCP		16	8
IC49	TC40175BCP		16	8
IC50	TC40175BCP		16	8
IC51	TC40175BCP		16	8
IC52	TC40175BCP		16	8
IC53	TC40175BCP		16	8
IC54	TC40175BCP		16	8
IC55	TC40175BCP		16	8
IC56	TC40175BCP		16	8
IC61	TC4024BP		14	7
IC101	MB8747		22	11
IC102	TC4021BP		16	8

REF	TYPE	+12V	+5V	GND
IC103	TC4021BP		16	8
IC104	TC4022BP		16	8
IC105	TC4024BP		14	7
IC106	TC4013BP		14	7
IC107	TC4528BP		16	8
IC108	TC4053BP		16	8
IC109	TC4520BP		16	8
IC110	MC14538BCP		16	8
IC111	SN74LS04N		14	7
IC112	MC14503BCP		16	8
IC113	TC4069UBP		14	7
IC114	TC4069UBP		14	7
IC115	TC4069UBP		14	7
IC116	TC4001BP		14	7
IC117	TC4001BP		14	7
IC118	TC4071BP		14	7
IC119	TC4071BP		14	7
IC120	TC4071BP		14	7
IC121	TC4071BP		14	7
IC122	TC4071BP		14	7
IC123	TC4071BP		14	7
IC124	TC4030BP		14	7
IC125	TC4081BP		14	7

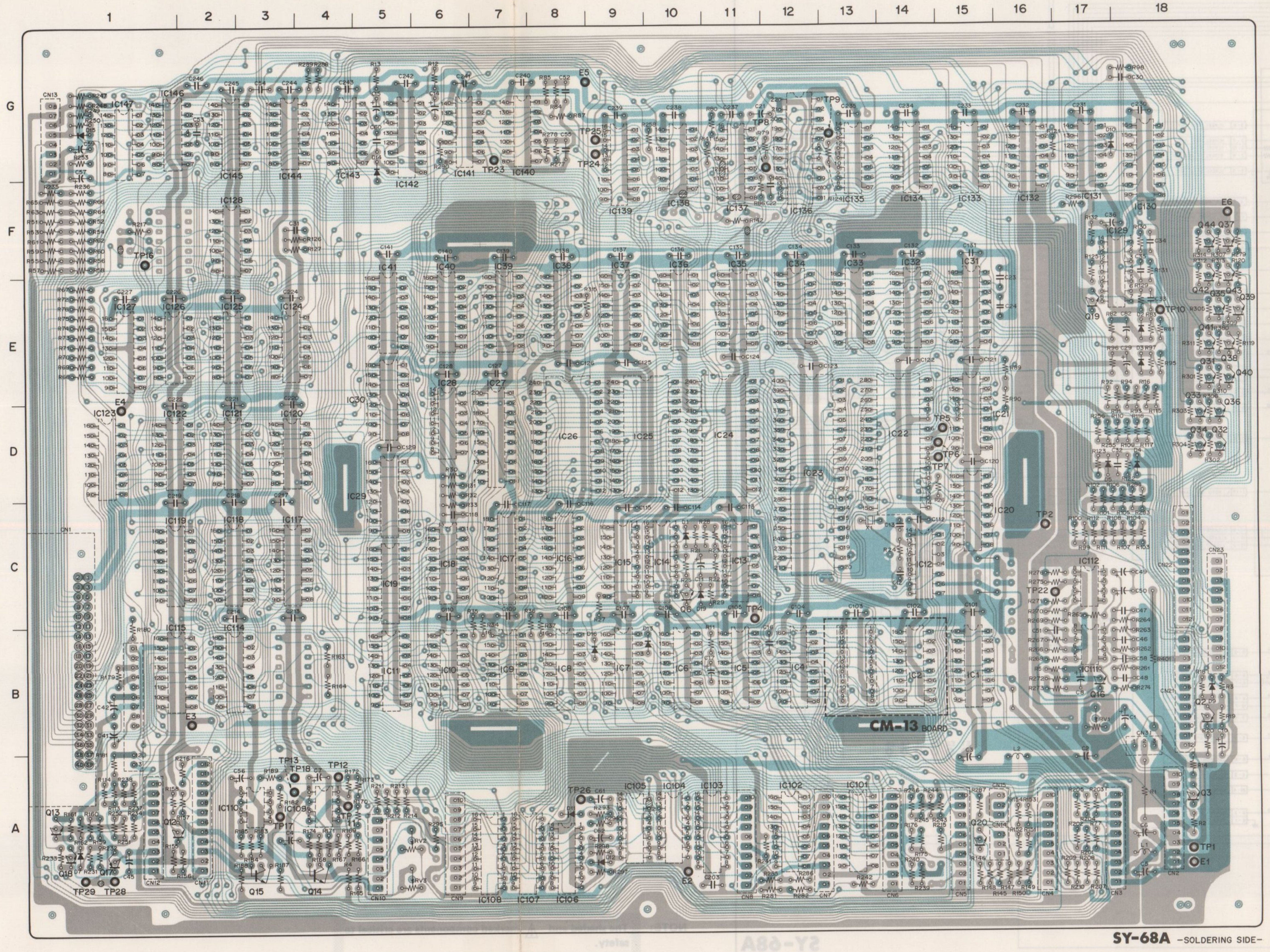
REF	TYPE	+12V	+5V	GND
IC126	TC4081BP		14	7
IC127	TC4081BP		14	7
IC128	TC4081BP		14	7
IC129	TC4073BP		14	7
IC130	TC4073BP		14	7
IC131	TC4073BP		14	7
IC132	TC4073BP		14	7
IC133	TC4081BP		14	7
IC134	TC4069UBP		14	7
IC202	M54517P	—	—	8
IC203	M54517P	—	—	8
IC204	M54517P	—	—	8
IC206	M54517P	—	—	8
IC207	M54517P	—	—	8
IC208	M54517P	—	—	8
IC209	M54517P	—	—	8
IC210	M54517P	—	—	8
IC351	NJM2903D	—	—	4
IC352	NJM4558D-D	—	—	4
IC353	μPC4558C	—	—	4
IC354	BX343	13		7
IC355	NJM2903D	—	—	4


SY-68A
PT-9(C)
Q1 2SC1983
REG 12V
REG 6.5V
RV1; +5 SET
TP1
TP2
E1 E2 E3 E4 E5 E6
8-7 H; VIDEO MUTING OUT
8-8 H; AUDIO CH-1 PB OUT
8-9 H; AUDIO CH-2 PB OUT
8-10 H; 353 PB OUT
7-6 H; AUDIO CH-2 EE OUT
7-7 H; AUDIO CH-1 EE OUT
7-8 L; VIDEO EE OUT
7-9 L; VIDEO EE OUT
7-10 L; AUDIO ERASE OSC OUT
8-1 H; SERVO REC/EE OUT
8-3 H; SERVO REC/EE OUT
8-4 L; EDIT INSERT REC OUT
9-4 L; CTL REC OUT
9-5 H; FULL ERASE OUT
9-10 L; AUDIO/VIDEO REC OUT
9-1 H; AUDIO REC CH-2 OUT
9-3 L; VIDEO REC OUT
9-2 H; AUDIO REC CH-1 OUT
9-9 H; AUDIO DUB OUT
10-4 H; SKEW SOL ON OUT
3-3 REG 12V OUT
2-5 REG 12V IN
13-7 REG 12V OUT
2-4 REG 7V IN
2-3 REG 7V IN
21-3 REG 7V OUT

NOTE: The shaded and ⚠-marked components are critical to safety.
Replace only with same components as specified.

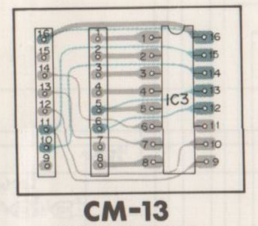
SY-68A (SYSTEM CONTROL)
PT-9

10181 ~ 10380 (AEP)
10021 ~ 10120 (UK)



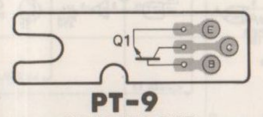
SY-68A -SOLDERING SIDE-

CN1	B - 1
CN2	A - 18
CN3	A - 18
CN4	A - 16
CN5	A - 15
CN6	A - 13
CN7	A - 12
CN8	A - 11
CN9	A - 6
CN10	A - 5
CN11	A - 2
CN12	A - 1
CN13	G - 1
CN14	A - 15
CN15	A - 15
CN21	B - 18
CN22	C - 18
CN23	C - 18
CN31	B - 18
D1	C - 10
D2	E - 18
D3	E - 18
D4	D - 18
D5	D - 18
D7	A - 1
D9	B - 18
D10	F - 18
D11	A - 8
D12	A - 9
D13	B - 9
D14	F - 5
D15	G - 1
D16	B - 8
E1	A - 18
E2	A - 10
E3	B - 1
E4	D - 1
E5	G - 6
E6	F - 18
IC1	B - 15
IC2	B - 14
IC3	B - 13
IC4	B - 12
IC5	B - 11
IC6	B - 10
IC7	B - 9
IC8	B - 8
IC9	B - 7
IC10	B - 6
IC11	B - 5
IC12	C - 14
IC13	C - 11
IC14	C - 10
IC15	C - 9
IC16	C - 8
IC17	C - 7
IC18	C - 6
IC19	C - 5
IC20	D - 15
IC21	D - 15
IC22	D - 14
IC23	D - 12
IC24	D - 11
IC25	D - 9
IC26	D - 8
IC27	D - 7
IC28	D - 6
IC29	D - 5
IC30	D - 5
IC31	E - 15
IC32	E - 14
IC33	E - 13
IC34	E - 12
IC35	E - 11
IC36	E - 10
IC37	E - 9
IC38	E - 8
IC39	E - 7
IC40	E - 6
IC41	E - 5
IC101	A - 13
IC102	A - 12
IC103	A - 10
IC104	A - 10
IC105	A - 9
IC106	A - 8
IC107	A - 7
IC108	A - 7
IC109	A - 4
IC110	A - 3
IC111	B - 17
IC112	B - 17
IC114	B - 2
IC115	B - 1
IC116	B - 1
IC117	C - 3
IC118	C - 2
IC119	C - 1
IC120	D - 3
IC121	D - 2
IC122	D - 1
IC123	D - 1
IC124	E - 3
IC125	E - 2
IC126	E - 1
IC127	E - 1
IC128	F - 2
IC129	F - 18
IC130	G - 18
IC131	G - 17
IC132	G - 16
IC133	G - 15
IC134	G - 14
IC135	G - 13
IC136	G - 12
IC137	G - 11
IC138	G - 10
IC139	G - 9
IC140	G - 7
IC141	G - 6
IC142	G - 5
IC143	G - 4
IC144	G - 3
IC145	G - 2
IC146	G - 1
IC147	G - 1
Q2	B - 18
Q3	B - 18
Q6	C - 10
Q12	A - 1
Q13	A - 1
Q14	A - 4
Q15	A - 3
Q16	B - 17
Q17	A - 1
Q18	A - 1
Q19	E - 17
Q20	A - 15
Q31	E - 18
Q32	D - 18
Q33	D - 18
Q34	D - 18
Q35	E - 18
Q36	D - 18
Q37	F - 18
Q38	E - 18
Q39	E - 18
Q40	E - 18
Q41	E - 18
Q42	E - 18
Q43	E - 18
Q44	F - 18
RV1	B - 18
RV2	A - 5
RV3	A - 5
TP1	A - 18
TP2	C - 16
TP4	C - 11
TP5	D - 14
TP6	D - 14
TP7	D - 14
TP8	F - 11
TP9	G - 13
TP10	E - 18
TP11	A - 4
TP12	A - 4
TP13	A - 3
TP16	F - 1
TP17	A - 3
TP18	A - 3
TP22	C - 16
TP23	G - 7
TP24	G - 9
TP25	G - 9
TP26	A - 8
TP28	A - 1
TP29	A - 1
X1	C - 14



CM-13
-COMPONENT SIDE-

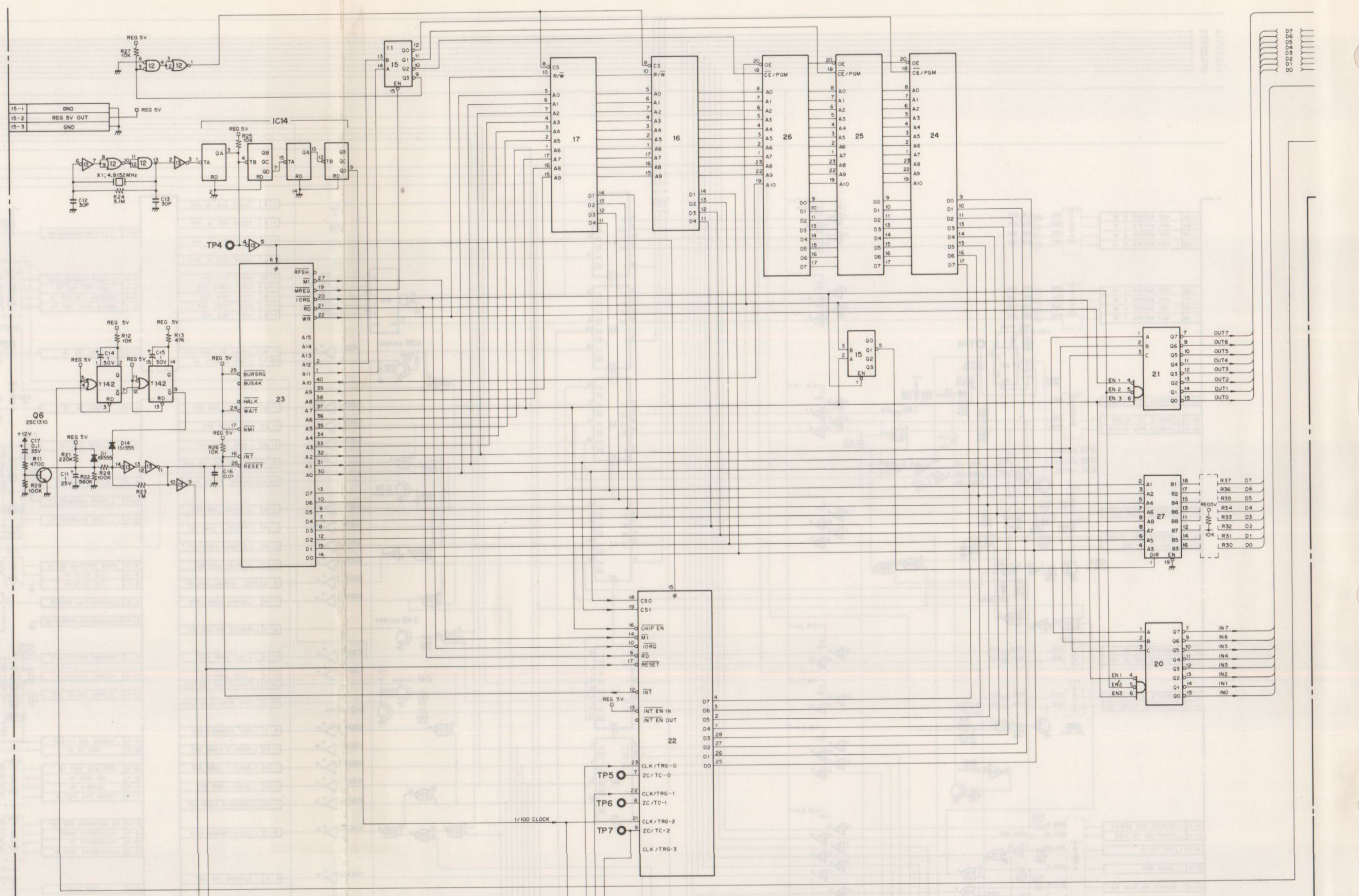
TO CN31



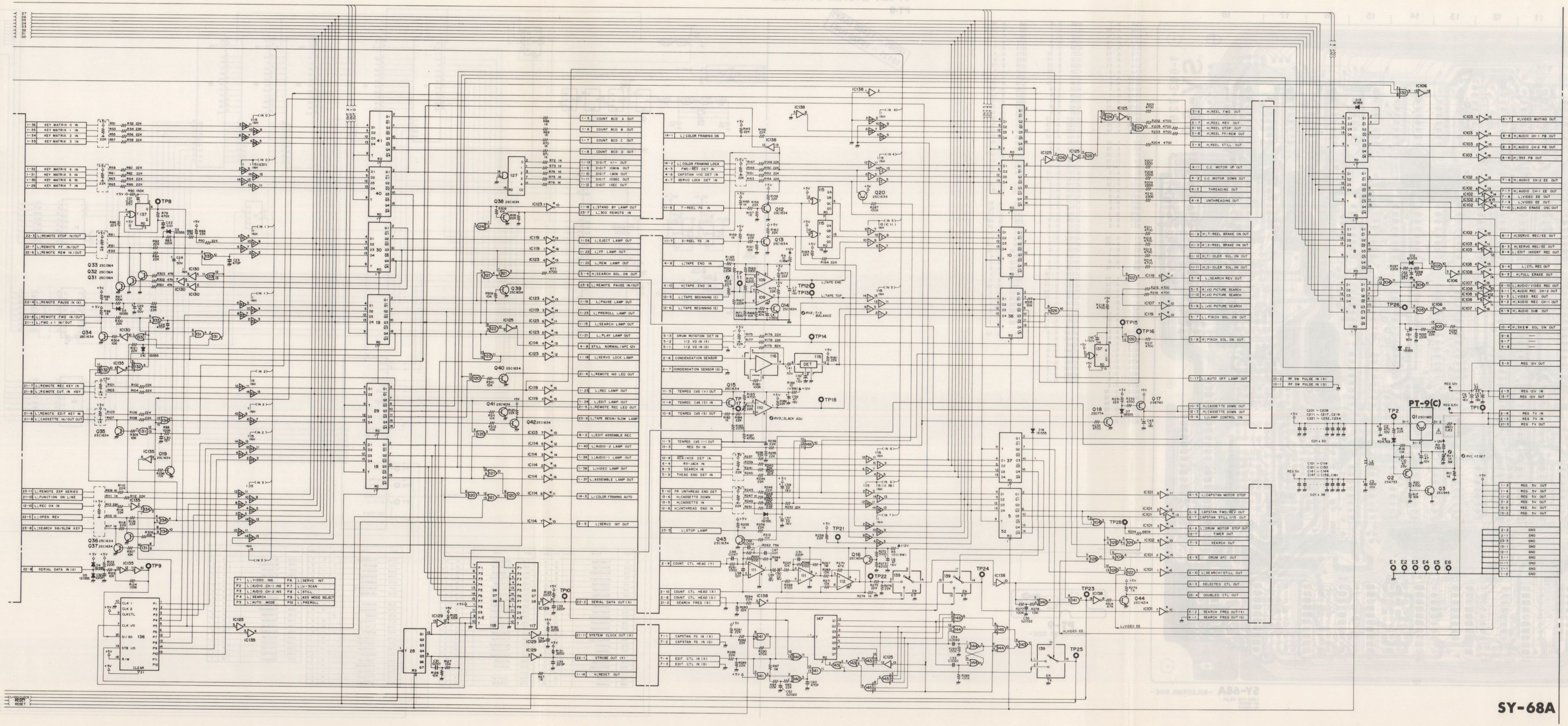
PT-9
-SOLDERING SIDE-

SY-68A (SYSTEM CONTROL)
PT-9

10181 ~ 10380 (AEP)
10021 ~ 10120 (UK)



REF	TYPE	+12V	+5V	GND
IC1	TC40175BP		16	8
IC2	TC40175BP		16	8
IC3	MC14503BCP		16	8
IC4	MC14503BCP		16	8
IC5	TC40175BP		16	8
IC6	TC40175BP		16	8
IC7	TC40175BP		16	8
IC8	TC40175BP		16	8
IC9	TC40175BP		16	8
IC10	TC40175BP		16	8
IC11	MC14503BCP		16	8
IC12	TC40H002P		14	7
IC13	TC40H368P		16	8
IC14	SN74LS390N		16	8
IC15	SN74LS139N		16	8
IC16	μPD444C		18	9
IC17	μPD444C		18	9
IC18	TC40175BP		16	8
IC19	TC40175BP		16	8
IC20	SN74LS138N		16	8
IC21	SN74LS138N		16	8
IC22	LH0082		24	5
IC23	LH0080		11	29
IC24	2716S68E1D		24	12
IC25	2716S68E2E		24	12
IC26	2716S68E3E		24	12
IC27	SN74LS245N		20	10
IC28	TC4024BP		14	7
IC29	TC40175BP		16	8
IC30	TC40175BP		16	8
IC31	MC14503BCP		16	8
IC32	MC14503BCP		16	8
IC33	MC14503BCP		16	8
IC34	MC14503BCP		16	8
IC35	MC14503BCP		16	8
IC36	MC14503BCP		16	8
IC37	TC40175BP		16	8
IC38	TC40175BP		16	8
IC39	MC14503BCP		16	8
IC40	TC40175BP		16	8
IC41	TC40175BP		16	8
IC101	M54517P	—	—	8
IC102	M54517P	—	—	8
IC103		—	—	8
IC104	TC4071BP		14	7
IC105	TC4073BP		14	7
IC106	TC4069UBP		14	7
IC107	TC4528BP	—	—	8
IC108	M54517P	—	—	8
IC109	NJM2903D	—	—	4
IC110	NJM2903D	—	—	4
IC111	NJM4558D-D	—	—	4
IC112	μPC4558C	—	—	4
IC114	M54517P	—	—	8
IC115	TC4520BP		16	8
IC116	BX343	13		7
IC117	TC4021BP		16	8
IC118	TC4021BP		16	8
IC119	M54517P	—	—	8
IC120	TC4081BP		14	7
IC121	TC4071BP		14	7
IC122	TC4081BP		14	7
IC123	M54517P	—	—	8
IC124	TC4001BP		14	7
IC125	TC4069UBP		14	7
IC126	TC4081BP		14	7
IC127	TC4022BP		16	8
IC128	TC4071BP		14	7
IC129	SN74LS04N		14	7
IC130	MC14503BCP		16	8
IC131	TC4081BP		14	7
IC132	TC4073BP		14	7
IC133	TC4071BP		14	7
IC134	TC4071BP		14	7
IC135	TC4069UBP		14	7
IC136	MB8747		22	11
IC137	TC4528BP		16	8
IC138	TC4069UBP		14	7
IC139	TC4053BP		16	8
IC140	TC4030BP		14	7
IC141	TC4081BP		14	7
IC142	HD14538BP		16	8
IC143	TC4071BP		14	7
IC144	TC4001BP		14	7
IC145	TC4073BP		14	7
IC146	TC4073BP		14	7
IC147	TC4024BP		14	7

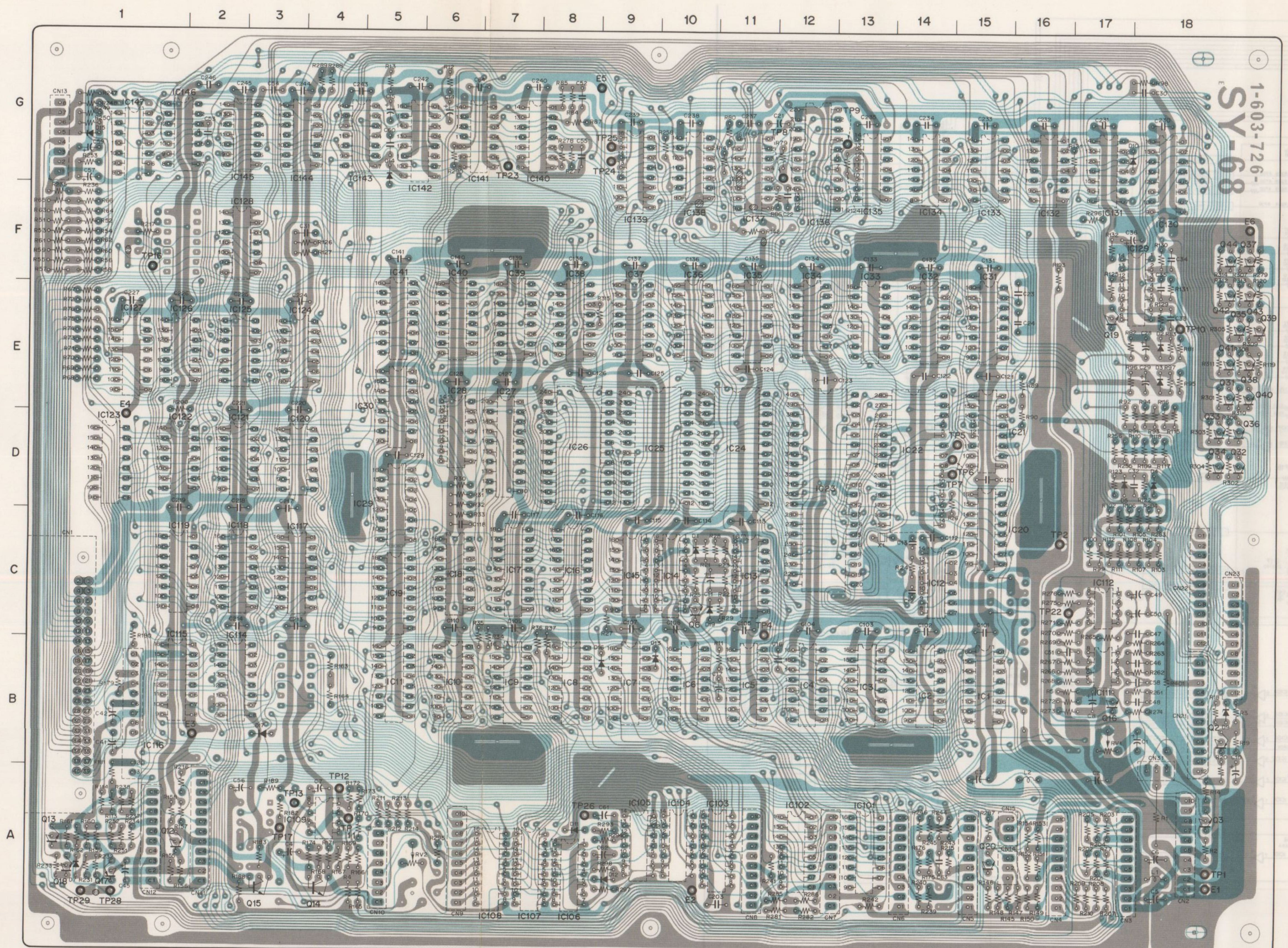

PT-9(C)
TP8
TP9
TP10
TP12
TP13
TP14
TP15
TP16
TP18
TP21
TP22
TP23
TP24
TP25
TP26
TP28
TP1
TP2
E1 E2 E3 E4 E5 E6

SY-68A

NOTE: **The shaded and ⚠-marked components are critical to safety.**
Replace only with same components as specified.

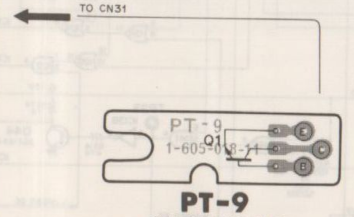
SY-68A (SYSTEM CONTROL)
PT-9

10381 AND LATER (AEP)
10121 AND LATER (UK)



SY-68A -SOLDERING SIDE-
1-603-726-23,24
VO-5850P
VO-5850S

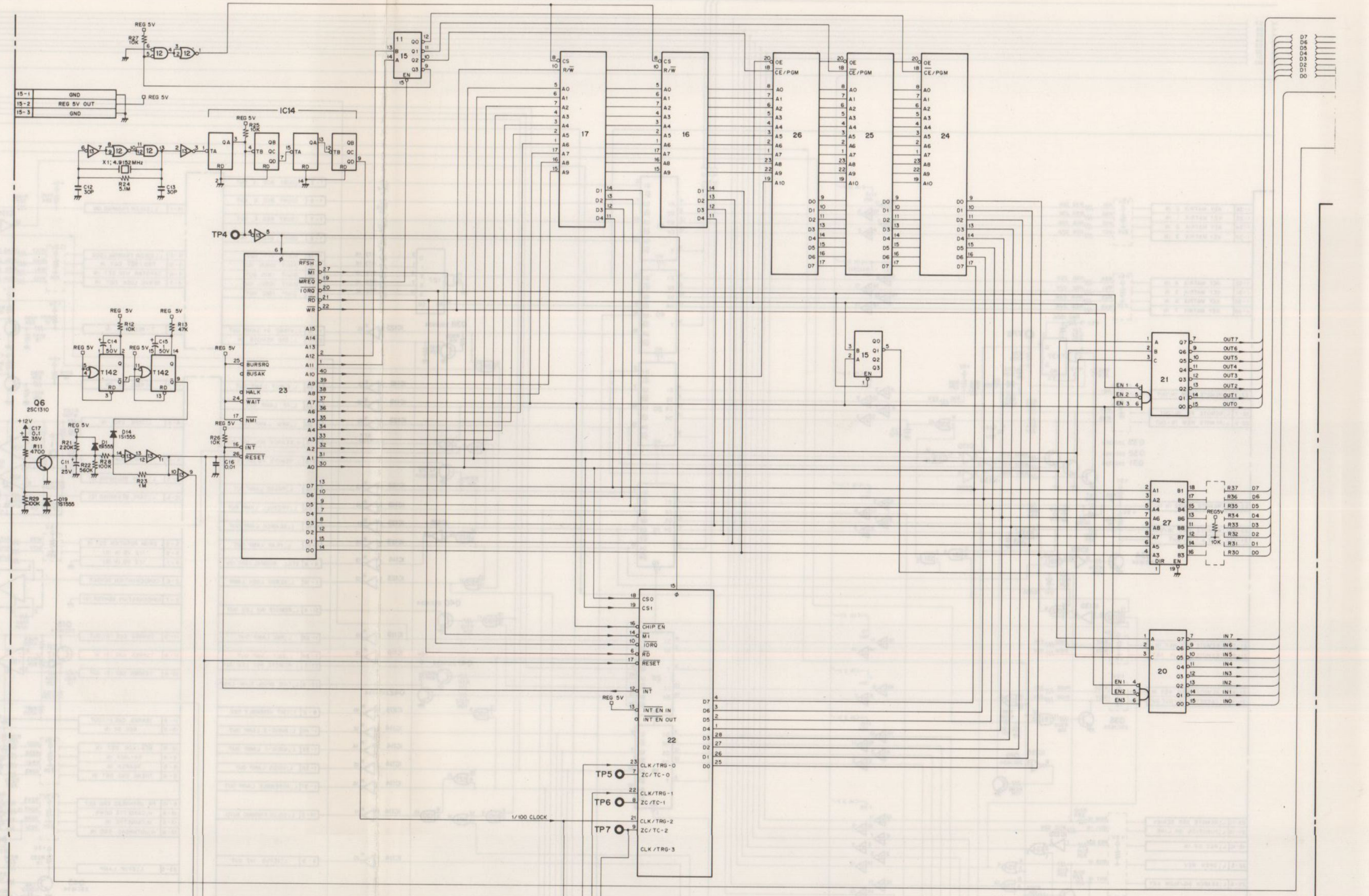
CN1	B - 1
CN2	A - 18
CN3	A - 18
CN4	A - 16
CN5	A - 15
CN6	A - 13
CN7	A - 12
CN8	A - 11
CN9	A - 6
CN10	A - 5
CN11	A - 2
CN12	A - 1
CN13	G - 1
CN14	A - 15
CN15	A - 15
CN21	B - 18
CN22	C - 18
CN23	C - 18
CN31	B - 18
D1	C - 10
D2	E - 18
D3	E - 18
D4	D - 18
D5	D - 18
D7	A - 1
D9	B - 18
D10	F - 18
D11	A - 8
D12	A - 9
D13	B - 9
D14	F - 5
D15	G - 1
D16	B - 8
D17	B - 3
E1	A - 18
E2	A - 10
E3	B - 1
E4	D - 1
E5	G - 6
E6	F - 18
IC1	B - 15
IC2	B - 14
IC3	B - 13
IC4	B - 12
IC5	B - 11
IC6	B - 10
IC7	B - 9
IC8	B - 8
IC9	B - 7
IC10	B - 6
IC11	B - 5
IC12	C - 14
IC13	C - 11
IC14	C - 10
IC15	C - 9
IC16	C - 8
IC17	C - 7
IC18	C - 6
IC19	C - 5
IC20	D - 15
IC21	D - 15
IC22	D - 14
IC23	D - 12
IC24	D - 11
IC25	D - 9
IC26	D - 8
IC27	D - 7
IC28	D - 6
IC29	D - 5
IC30	D - 5
IC31	E - 15
IC32	E - 14
IC33	E - 13
IC34	E - 12
IC35	E - 11
IC36	E - 10
IC37	E - 9
IC38	E - 8
IC39	E - 7
IC40	E - 6
IC41	E - 5
IC101	A - 13
IC102	A - 12
IC103	A - 10
IC104	A - 10
IC105	A - 9
IC106	A - 8
IC107	A - 7
IC108	A - 7
IC109	A - 4
IC111	B - 17
IC112	B - 17
IC114	B - 2
IC115	B - 1
IC116	B - 1
IC117	C - 3
IC118	C - 2
IC119	C - 1
IC120	D - 3
IC121	D - 2
IC122	D - 1
IC123	D - 1
IC124	E - 3
IC125	E - 2
IC126	E - 1
IC127	E - 1
IC128	F - 2
IC129	F - 18
IC130	G - 18
IC131	G - 17
IC132	G - 16
IC133	G - 15
IC134	G - 14
IC135	G - 13
IC136	G - 12
IC137	G - 11
IC138	G - 10
IC139	G - 9
IC140	G - 7
IC141	G - 6
IC142	G - 5
IC143	G - 4
IC144	G - 3
IC145	G - 2
IC146	G - 1
IC147	G - 1
Q2	B - 18
Q3	B - 18
Q6	C - 10
Q12	A - 1
Q13	A - 1
Q14	A - 4
Q15	A - 3
Q16	B - 17
Q17	A - 1
Q18	A - 1
Q19	E - 17
Q20	A - 15
Q31	E - 18
Q32	D - 18
Q33	D - 18
Q34	D - 18
Q35	E - 18
Q36	D - 18
Q37	F - 18
Q38	E - 18
Q39	E - 18
Q40	E - 18
Q41	E - 18
Q42	E - 18
Q43	E - 18
Q44	F - 18
RV1	B - 18
RV2	A - 5
TP1	A - 18
TP2	C - 16
TP4	C - 11
TP5	D - 14
TP6	D - 14
TP7	D - 14
TP8	F - 11
TP9	G - 13
TP10	E - 18
TP11	A - 4
TP12	A - 4
TP13	A - 3
TP16	F - 1
TP17	A - 3
TP22	C - 16
TP23	G - 7
TP24	G - 9
TP25	G - 9
TP26	A - 8
TP28	A - 1
TP29	A - 1
X1	C - 14



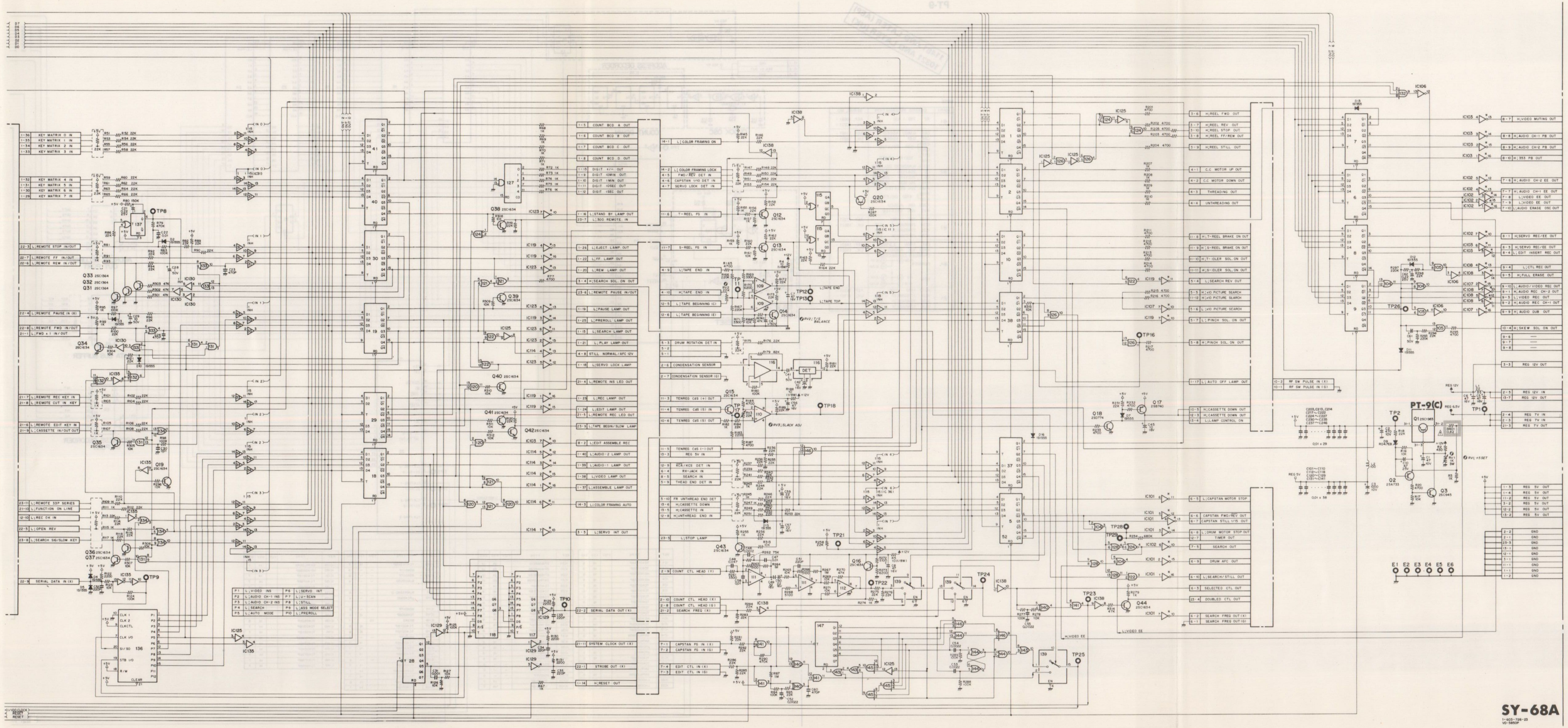
PT-9
-SOLDERING SIDE-

SY-68A (SYSTEM CONTROL)
PT-9

10381 ~ 11480 (AEP)
10121 ~ 10320 (UK)



REF	TYPE	+12V	+5V	GND
IC1	TC40175BP		16	8
IC2	TC40175BP		16	8
IC3	MC14503BCP		16	8
IC4	MC14503BCP		16	8
IC5	TC40175BP		16	8
IC6	TC40175BP		16	8
IC7	TC40175BP		16	8
IC8	TC40175BP		16	8
IC9	TC40175BP		16	8
IC10	TC40175BP		16	8
IC11	MC14503BCP		16	8
IC12	TC40H002P		14	7
IC13	TC40H368P		16	8
IC14	SN74LS390N		16	8
IC15	SN74LS139N		16	8
IC16	μPD444C		18	9
IC17	μPD444C		18	9
IC18	TC40175BP		16	8
IC19	TC40175BP		16	8
IC20	SN74LS138N		16	8
IC21	SN74LS138N		16	8
IC22	LH0082		24	5
IC23	LH0080		11	29
IC24	2716S68E1D		24	12
IC25	2716S68E2E		24	12
IC26	2716S68E3E		24	12
IC27	SN74LS245N		20	10
IC28	TC4024BP		14	7
IC29	TC40175BP		16	8
IC30	TC40175BP		16	8
IC31	MC14503BCP		16	8
IC32	MC14503BCP		16	8
IC33	MC14503BCP		16	8
IC34	MC14503BCP		16	8
IC35	MC14503BCP		16	8
IC36	MC14503BCP		16	8
IC37	TC40175BP		16	8
IC38	TC40175BP		16	8
IC39	MC14503BCP		16	8
IC40	TC40175BP		16	8
IC41	TC40175BP		16	8
IC101	M54517P	—	—	8
IC102	M54517P	—	—	8
IC103		—	—	8
IC104	TC4071BP		14	7
IC105	TC4081BP		14	7
IC106	TC4069UBP		14	7
IC107	M54517P	—	—	8
IC108	M54517P	—	—	8
IC109	NJM2903D	—	—	4
IC110	NJM2903D	—	—	4
IC111	NJM4558D-D	—	—	4
IC112	μPC4558C	—	—	4
IC114	M54517P	—	—	8
IC115	TC4520BP		16	8
IC116	BX343	13		7
IC117	TC4021BP		16	8
IC118	TC4021BP		16	8
IC119	M54517P	—	—	8
IC120	TC4081BP		14	7
IC121	TC4071BP		14	7
IC122	TC4081BP		14	7
IC123	M54517P	—	—	8
IC124	TC4001BP		14	7
IC125	TC4069UBP		14	7
IC126	TC4081BP		14	7
IC127	TC4022BP		16	8
IC128	TC4071BP		14	7
IC129	SN74LS04N		14	7
IC130	MC14503BCP		16	8
IC131	TC4081BP		14	7
IC132	TC4073BP		14	7
IC133	TC4071BP		14	7
IC134	TC4071BP		14	7
IC135	TC4069UBP		14	7
IC136	MB8747		22	11
IC137	HD14538BP		16	8
IC138	TC4069UBP		14	7
IC139	TC4053BP		16	8
IC140	TC4030BP		14	7
IC141	TC4081BP		14	7
IC142	HD14538BP		16	8
IC143	TC4071BP		14	7
IC144	TC4001BP		14	7
IC145	TC4073BP		14	7
IC146	TC4073BP		14	7
IC147	TC4024BP		14	7


PT-9(C)
SY-68A
TP1
TP2
TP8
TP9
TP12
TP13
TP16
TP18
TP21
TP22
TP23
TP24
TP25
TP26
TP28
E1 E2 E3 E4 E5 E6

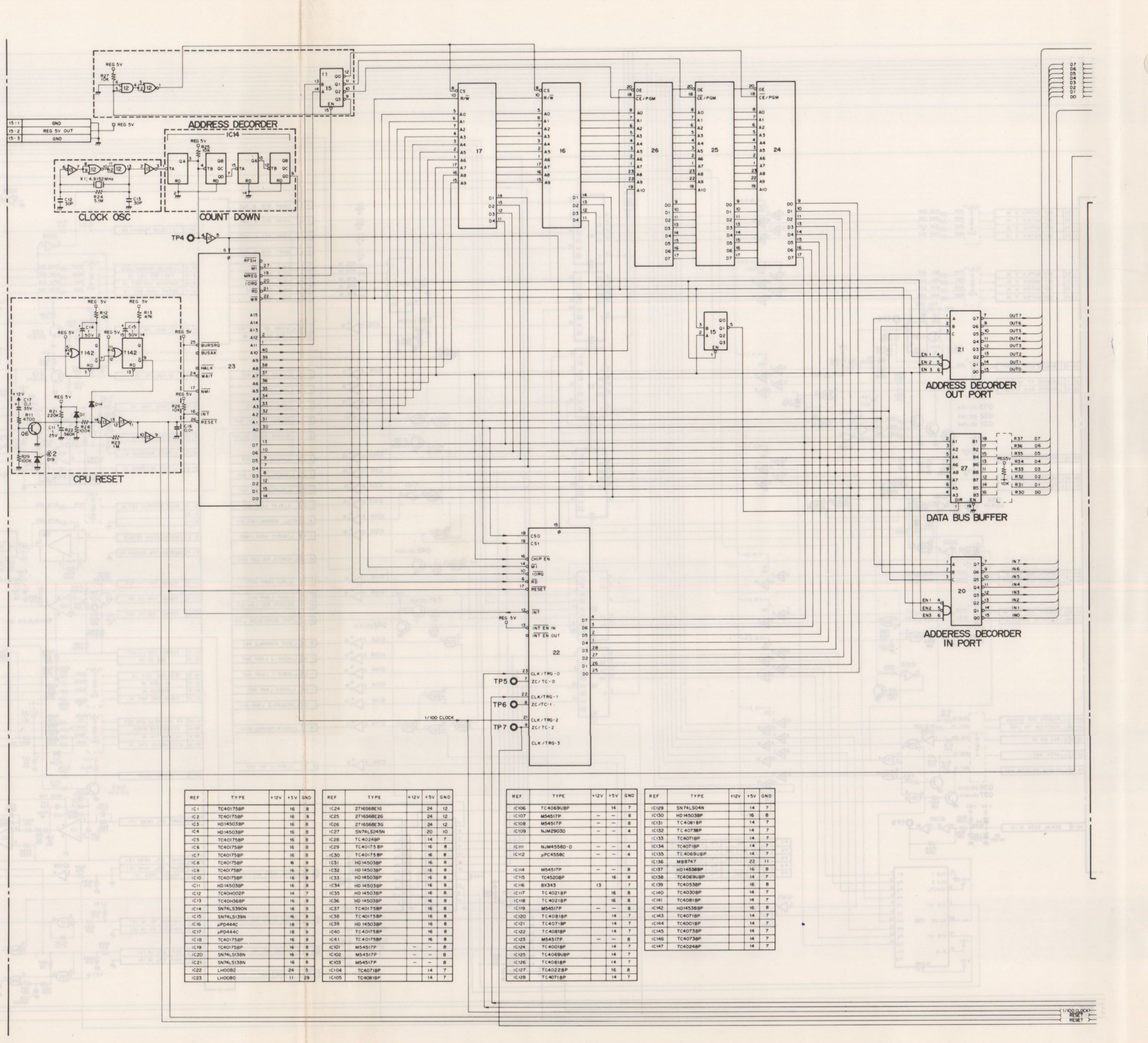
NOTE: The shaded and ⚠ -marked components are critical to safety.
Replace only with same components as specified.

SY-68A (SYSTEM CONTROL)
PT-9

11481 AND LATER (AEP)
10321 AND LATER (UK)

NOTE

MARK	CHANGE INFORMATION	SERIAL NO.
※1	R2 750 → 430	AEP; 10681 ~ UK; 10221 ~
※2	C63 0.0022 ADDED C64 0.01 ADDED C222, C241) 0.01 DELETED D17, D19) 1SS119 ADDED IC110 NJM2903D DELETED Q2 2SA733A → 2SA1115 Q6 2SC1310 → 2SC2603 Q15 2SC1634 → 2SD1020 R184 22K DELETED R185, R187) 4700 DELETED R200 10K ADDED RV3 22K DELETED	AEP; 11481 ~ UK; 10321 ~
※3	R121 22K → 100K IC24 2716S68E1D → E1F IC25 2716S68E2E → E2F IC26 2716S68E3E → E3F	AEP; 12981 ~ UK; 10621 ~
※4	C61 1/50V → 3.3/50V R402 10K ADDED CHANGED CONNECTION FORMER IC138-⑫ — ⑤-IC131, ⑪-IC132 ↓ NEW IC8-⑭, IC118-⑦ — ⑤-IC131, ⑪-IC132	AEP; 14631 ~ UK; 11021 ~
※5	R233 4700 → 1500 IC24 2716S68E1F → E1G IC25 2716S68E2F → E2G IC26 2716S68E3F → E3G	AEP; 15231 ~ UK; 11101 ~

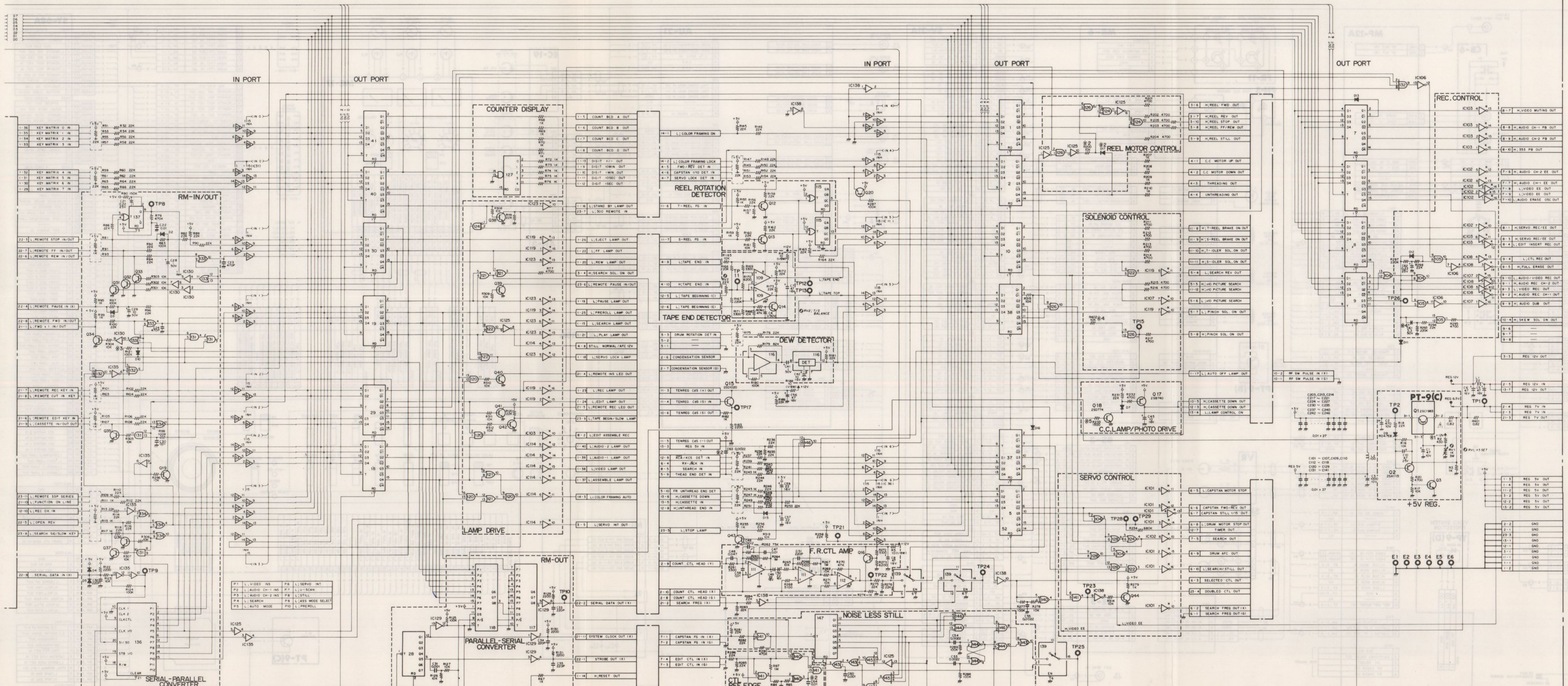


REF	TYPE	+12V	+5V	GND
IC1	TC40175BP		16	8
IC2	TC40175BP		16	8
IC3	HD14503BP		16	8
IC4	HD14503BP		16	8
IC5	TC40175BP		16	8
IC6	TC40175BP		16	8
IC7	TC40175BP		16	8
IC8	TC40175BP		16	8
IC9	TC40175BP		16	8
IC10	TC40175BP		16	8
IC11	HD14503BP		16	8
IC12	TC40H002P		14	7
IC13	TC40H368P		16	8
IC14	SN74LS390N		16	8
IC15	SN74LS139N		16	8
IC16	µPD444C		18	9
IC17	µPD444C		18	9
IC18	TC40175BP		16	8
IC19	TC40175BP		16	8
IC20	SN74LS138N		16	8
IC21	SN74LS138N		16	8
IC22	LH0082		24	5
IC23	LH0080		11	29

REF	TYPE	+12V	+5V	GND
IC24	2716S68E1G		24	12
IC25	2716S68E2G		24	12
IC26	2716S68E3G		24	12
IC27	SN74LS245N		20	10
IC28	TC4024BP		14	7
IC29	TC40175BP		16	8
IC30	TC40175BP		16	8
IC31	HD14503BP		16	8
IC32	HD14503BP		16	8
IC33	HD14503BP		16	8
IC34	HD14503BP		16	8
IC35	HD14503BP		16	8
IC36	HD14503BP		16	8
IC37	TC40175BP		16	8
IC38	TC40175BP		16	8
IC39	HD14503BP		16	8
IC40	TC40175BP		16	8
IC41	TC40175BP		16	8
IC101	M54517P	—	—	8
IC102	M54517P	—	—	8
IC103	M54517P	—	—	8
IC104	TC4071BP		14	7
IC105	TC4081BP		14	7

REF	TYPE	+12V	+5V	GND
IC106	TC4069UBP		14	7
IC107	M54517P	—	—	8
IC108	M54517P	—	—	8
IC109	NJM2903D	—	—	4
IC111	NJM4558D-D	—	—	4
IC112	µPC4558C	—	—	4
IC114	M54517P	—	—	8
IC115	TC4520BP		16	8
IC116	BX343	13		7
IC117	TC4021BP		16	8
IC118	TC4021BP		16	8
IC119	M54517P	—	—	8
IC120	TC4081BP		14	7
IC121	TC4071BP		14	7
IC122	TC4081BP		14	7
IC123	M54517P	—	—	8
IC124	TC4001BP		14	7
IC125	TC4069UBP		14	7
IC126	TC4081BP		14	7
IC127	TC4022BP		16	8
IC128	TC4071BP		14	7

REF	TYPE	+12V	+5V	GND
IC129	SN74LS04N		14	7
IC130	HD14503BP		16	8
IC131	TC4081BP		14	7
IC132	TC4073BP		14	7
IC133	TC4071BP		14	7
IC134	TC4071BP		14	7
IC135	TC4069UBP		14	7
IC136	MB8747		22	11
IC137	HD14538BP		16	8
IC138	TC4069UBP		14	7
IC139	TC4053BP		16	8
IC140	TC4030BP		14	7
IC141	TC4081BP		14	7
IC142	HD14538BP		16	8
IC143	TC4071BP		14	7
IC144	TC4001BP		14	7
IC145	TC4073BP		14	7
IC146	TC4073BP		14	7
IC147	TC4024BP		14	7


IN PORT
OUT PORT
RM-IN/OUT
COUNTER DISPLAY
LAMP DRIVE
RM-OUT
SERIAL-PARALLEL CONVERTER
PARALLEL-SERIAL CONVERTER
REEL ROTATION DETECTOR
TAPE END DETECTOR
DEW DETECTOR
F.R.CTL AMP
NOISE LESS STILL
CTL EDGE DETECTOR
IN PORT
OUT PORT
REEL MOTOR CONTROL
SOLENOID CONTROL
C.C.LAMP/PHOTO DRIVE
SERVO CONTROL
OUT PORT
REC. CONTROL
PT-9(C)
+5V REG.

SY-68A

All diodes are 1SS119 unless otherwise noted
All transistors are 2SC2603 unless otherwise noted
1-603-726-24,25
VO-5850P

NOTE: The shaded and ⚠-marked components are critical to safety.
Replace only with same components as specified.

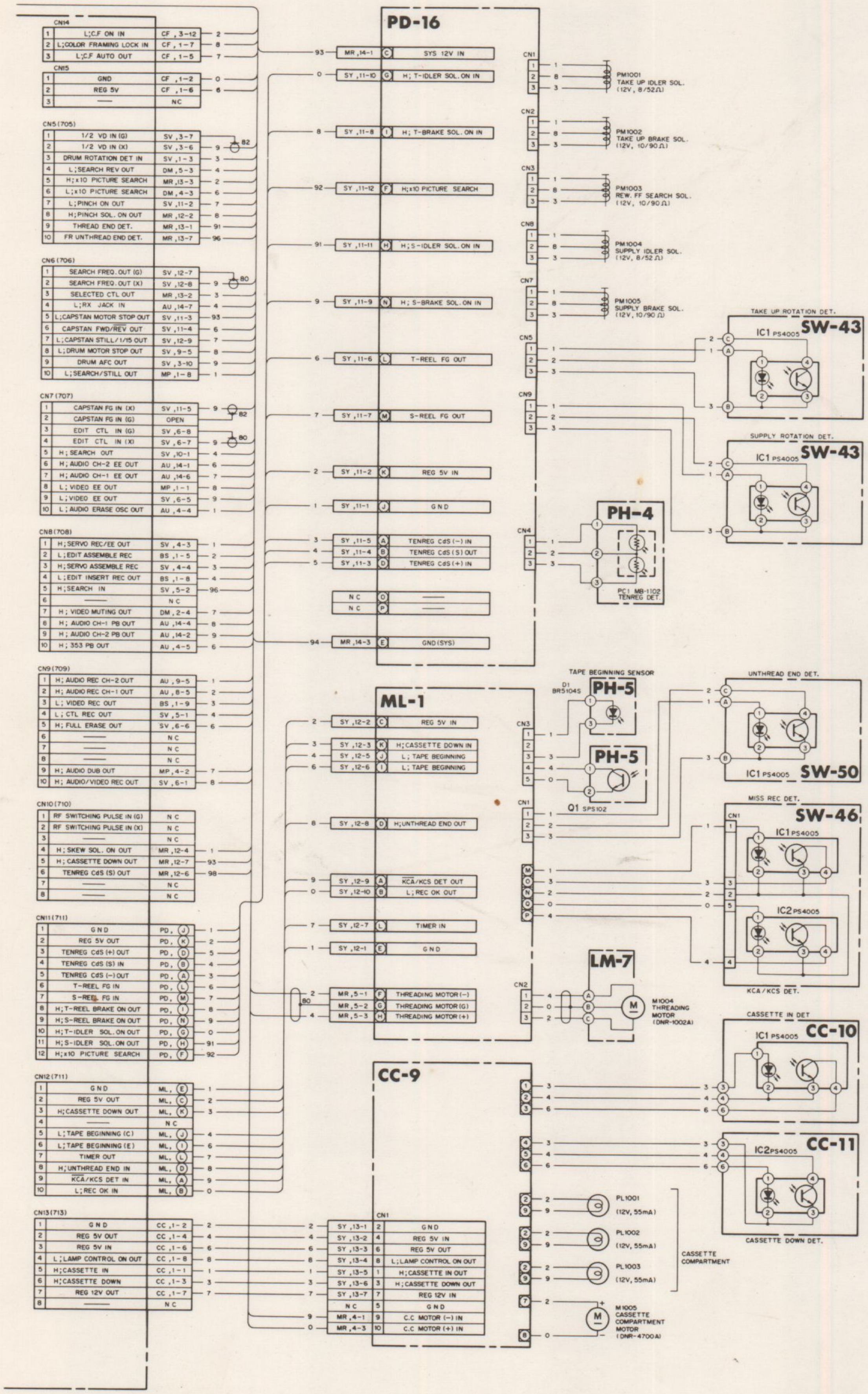
4 on 3 in
2 on 6 out
1 1/5

FRAME

AC-35
AC-36
AC-27
UR-02
SWITCHING REGULATOR
S/N 17011 AND LATER (AEP)
S/N 11351 AND LATER (UK)
S/N UP TO 17010 (AEP)
S/N UP TO 11350 (UK)
DC-10A
CF-7/CF-10
CL-4
DM-22A
CB-6
MP-12A
REAR PANEL CHASSIS
CAPSTAN MOTOR CONTROL BLOCK
DRUM MOTOR CONTROL BLOCK
PT-9(A)
VIDEO SYSTEM PROTECTION
TP-9(D)
FR-11
PH-5
MR-6
PT-9(B)
VR
SR-14
BS-3
RE-5
SV-31A
AU-21
HP-3
MI-3
EC-19
AH-3
MC-17
KY-13A
PT-9(C)
SY-68A

NOTE

MARK	CHANGE INFORMATION	SERIAL NO.
※1	AC-27) BOARD AC-36) DELETED AC-35 BOARD ADDED	AEP; 17011 ~ UK; 11351 ~


PD-16
ML-1
CC-9
PH-4
PH-5
PH-5
LM-7
SW-43
SW-43
SW-50
SW-46
CC-10
CC-11
CN14
CN15
CN5 (705)
CN6 (706)
CN7 (707)
CN8 (708)
CN9 (709)
CN10 (710)
CN11 (711)
CN12 (711)
CN13 (713)
PM1001 TAKE UP IDLER SOL. (12V, 8/52Ω)
PM1002 TAKE UP BRAKE SOL. (12V, 10/90Ω)
PM1003 REW. FF SEARCH SOL. (12V, 10/90Ω)
PM1004 SUPPLY IDLER SOL. (12V, 8/52Ω)
PM1005 SUPPLY BRAKE SOL. (12V, 10/90Ω)
TAKE UP ROTATION DET.
SUPPLY ROTATION DET.
IC1 PS4005
PC1 MB-1102 TENREG DET.
TAPE BEGINNING SENSOR
D1 BR5104S
Q1 SPS102
UNTHREAD END DET.
MISS REC DET.
IC2 PS4005
KCA/KCS DET.
CASSETTE IN DET
CASSETTE DOWN DET.
M1004 THREADING MOTOR (DNR-1002A)
PL1001 (12V, 55mA)
PL1002 (12V, 55mA)
PL1003 (12V, 55mA)
CASSETTE COMPARTMENT
M1005 CASSETTE COMPARTMENT MOTOR (DNR-4700A)

NOTE: The shaded and ⚠-marked components are critical to safety.
Replace only with same components as specified.

SECTION 15
SPARE PARTS AND FIXTURE

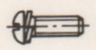
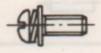
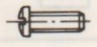
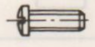
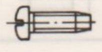
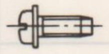
15-1. PARTS INFORMATION

1. Safety Related Component Warning
   Components identified by shading marked with   on the schematic diagrams, exploded views and electrical spare parts list are critical to safe operation. Replace these components with Sony parts whose parts numbers appear as shown in this manual or in service bulletins and service manual supplements published by Sony.
2. Replacement Parts supplied from Sony Parts Center will sometimes have different shape and outside view from the parts which actually in use. This is due to "accommodating the improved parts and/or engineering changes" or "standardization of genuine parts."
   - This manual's exploded views and electrical spare parts lists are indicating the parts numbers of "the standardized genuine parts at present".
   - Regarding engineering parts changes in our engineering department, refer Sony service bulletins and service manual supplements.
3. Printed Components in Bold-Face type on the exploded views and electrical spare parts list are normally stocked for replacement purposes. The remaining parts are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
4. Item with no part number and/or no description are not stocked because they are seldom required for routine service.
5. (T) after a spring description is shown on the exploded views in order to indicate the number of a spring turn required for the use.
   (Example) Spring, tension (24T); This spring must be cut at its 24th turn for actual use.

15-2. EXPLODED VIEW

- Exploded views are composed of the following blocks.

(1) Reel Chassis (1)
    Supply reel table
    Supply tension regulator arm
    Search solenoid
    Skew solenoid
    Supply main brake
    Reel motor
(2) Reel Chassis (2)
    Take-up reel table
    FF/REW idler
    Take-up main brake
    Take-up tension regulator arm
    R brake
    Still/miss-rec. detector
(3) Reel Chassis (3)
    Supply idler solenoid
    Take-up idler solenoid
    FF/REW idler pulley
    Supply brake solenoid
    Take-up brake solenoid
    10 times picture search solenoid
(4) Threading
    Threading ring
    Gear box
    T correction guide
    Tape beginning sensor
    FR detector
(5) Threading Arm
    T drawer arm
    S drawer arm
    Drawer lever
(6) Drum/Capstan
    Head drum
    Capstan motor
    Audio/CTL head
    Brush
(7) Erase Head Base
    Erase head base
    S guard
(8) Pinch Lever
    Pinch lever
    Pinch roller pre-set cam
    Pinch solenoid
(9) Cassette-up Compartment
(10) Function Control
    Function control panel (except ornamental panel)
(11) Chassis (1)
    Chassis (bottom view)
(12) Chassis (2)
    Chassis (rear view)
(13) Meter Panel
(14) Chassis (3)
    Chassis (top view)
(15) Printed Circuit Board
    Printed circuit board (except bottom block)
(16) Ornamental Panel (1)
    Ornamental panel (except control panel)
(17) Ornamental Panel (2)
    Control panel
(18) Switching Regulator (UR-02)

	PS 	PSW 	B (BZn N) 	B (Cr-N) 	PTT 	PTTWH 
2.6 x 4	7-621-972-05	———	7-621-912-10	7-621-912-18	———	———
2.6 x 6	7-621-972-25	7-621-981-15	7-621-912-30	7-621-912-38	———	———
2.6 x 8	7-621-972-35	7-621-981-25	7-621-912-40	7-621-912-48	———	———
3 x 5	7-686-446-01	———	———	———	———	
3 x 6	7-686-447-01	7-686-527-01	7-686-624-09	7-686-624-04	7-687-411-31	7-687-510-31
3 x 8	7-686-448-01	7-686-528-01	7-686-625-09	7-686-625-04	7-687-412-31	7-687-511-31
3 x 10	7-686-449-01	7-686-529-01	7-686-626-09	7-686-626-04	7-687-413-31	7-687-512-31
3 x 12	7-686-450-01	7-686-530-01	7-686-627-09	7-686-627-04	7-687-414-31	7-687-513-31
3 x 16	7-686-452-01	7-686-532-01	7-686-629-09	7-686-629-04	———	———
3 x 20	7-686-453-01	7-686-533-01	7-686-630-09	7-686-630-04	———	———
3 x 25	7-686-454-01	7-686-534-01	7-686-631-09	7-686-631-04		
4 x 8	7-686-468-01	7-686-548-01	7-686-635-09	7-686-635-04	———	———
4 x 12	7-686-470-01	7-686-550-01	7-686-637-09	7-686-637-04	———	———
4 x 14	7-686-471-01	———	7-686-638-09	7-686-638-04	———	———
4 x 16	7-686-472-01	———	7-686-639-09	7-686-639-04	———	———
4 x 20	7-686-473-01	———	7-686-640-09	7-686-640-04	———	———

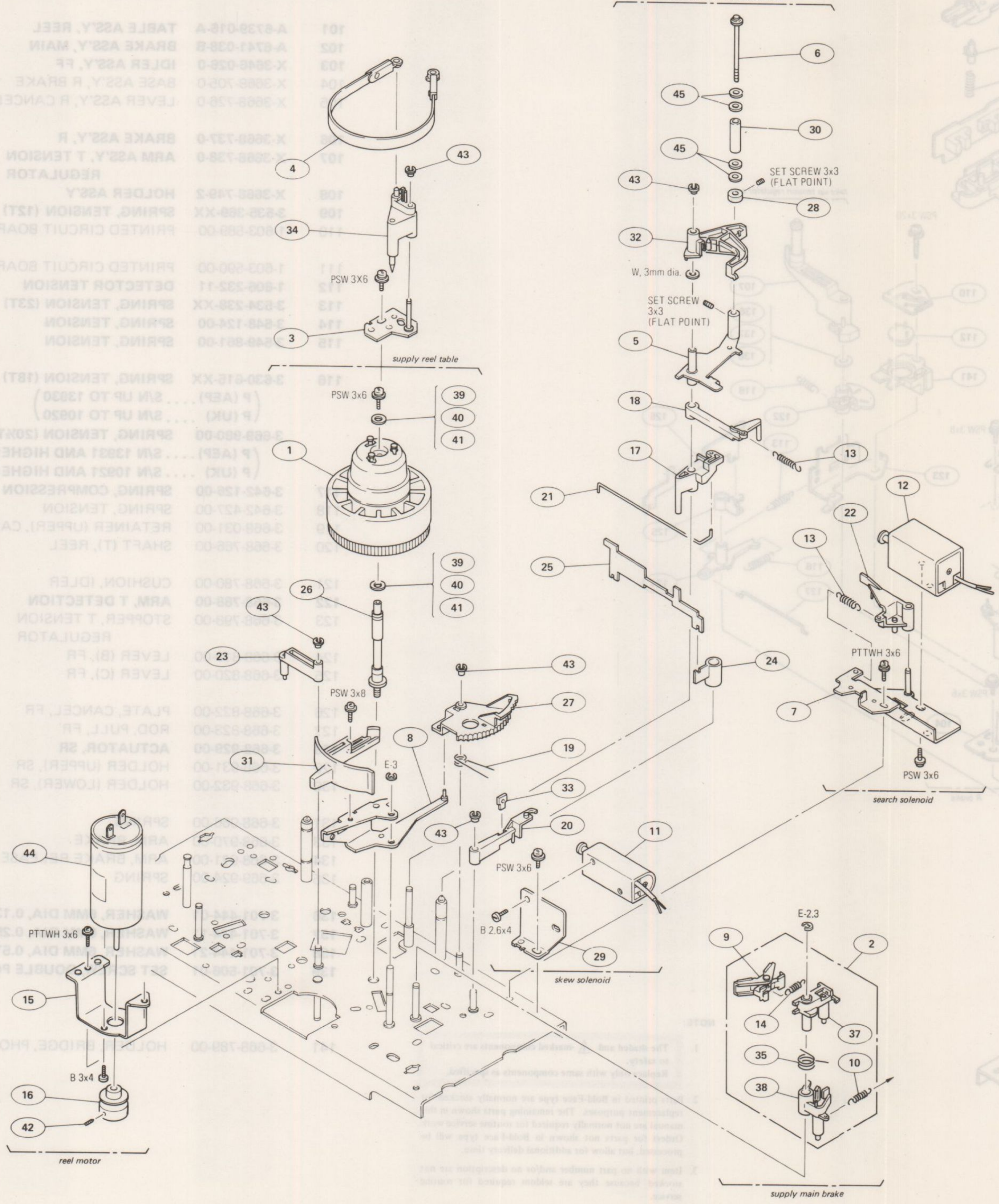
SCREW WASHER

	HEXAGON SOCKET SCREW	HEXAGON SET SCREW	(–) SET SCREW FLAT POINT	(–) SET SCREW CONE POINT
2.6 x 3	—	7-621-734-09	—	—
2.6 x 4	7-621-996-24	7-621-735-09	—	—
2.6 x 5	—	7-621-736-09	—	—
2.6 x 6	7-683-412-05	—	—	7-621-712-55
2.6 x8	7-683-413-05	—	—	7-621-712-65
2.6 x 10	—	—	—	7-621-712-75
3 x 4	—	7-683-238-01	—	—
3 x 5	—	—	7-683-175-01	—
3 x 6	7-683-403-04	—	7-683-176-01	7-683-176-21
3 x 8	7-683-404-04	—	—	7-683-177-21
3 x 10	7-683-405-04	—	—	7-683-178-21
3 x 12	—	—	—	7-683-179-21

	FLAT WASHER SMALL W.	FLAT WASHER MIDDLE W.	SPRING WASHER SW.	TOOTHED WASHER TYPE B LW.	HEXAGON NUT N.
2.6 mm	7-688-002-01	7-688-002-12	7-623-207-22	7-623-421-07	7-622-207-05
3 mm	7-688-003-01	7-688-003-12	7-688-003-11	7-623-422-07	7-684-023-04
4 mm	7-688-004-01	7-688-004-12	7-623-210-22	7-623-423-07	7-684-024-04
5 mm	7-688-005-01	7-688-005-01	7-623-212-22	—	7-684-025-04

	STOP RING E TYPE E.
2	7-624-104-04
2.3	7-624-105-04
3	7-624-106-04
4	7-624-108-04
5	7-624-109-04
6	7-624-110-04

Supply Side Reel Chassis


supply tension regulator arm
6
45
30
45
43
SET SCREW 3x3 (FLAT POINT)
28
32
W, 3mm dia.
SET SCREW 3x3 (FLAT POINT)
5
18
13
17
21
12
22
13
25
PTTWH 3x6
24
7
PSW 3x6
search solenoid
4
43
34
PSW 3X6
3
supply reel table
PSW 3x6
39
40
41
1
39
40
41
26
43
23
PSW 3x8
43
27
8
E-3
19
31
33
20
43
PSW 3x6
11
B 2.6x4
29
skew solenoid
44
PTTWH 3x6
15
B 3x4
16
42
reel motor
E-2.3
9
2
14
37
35
10
38
supply main brake

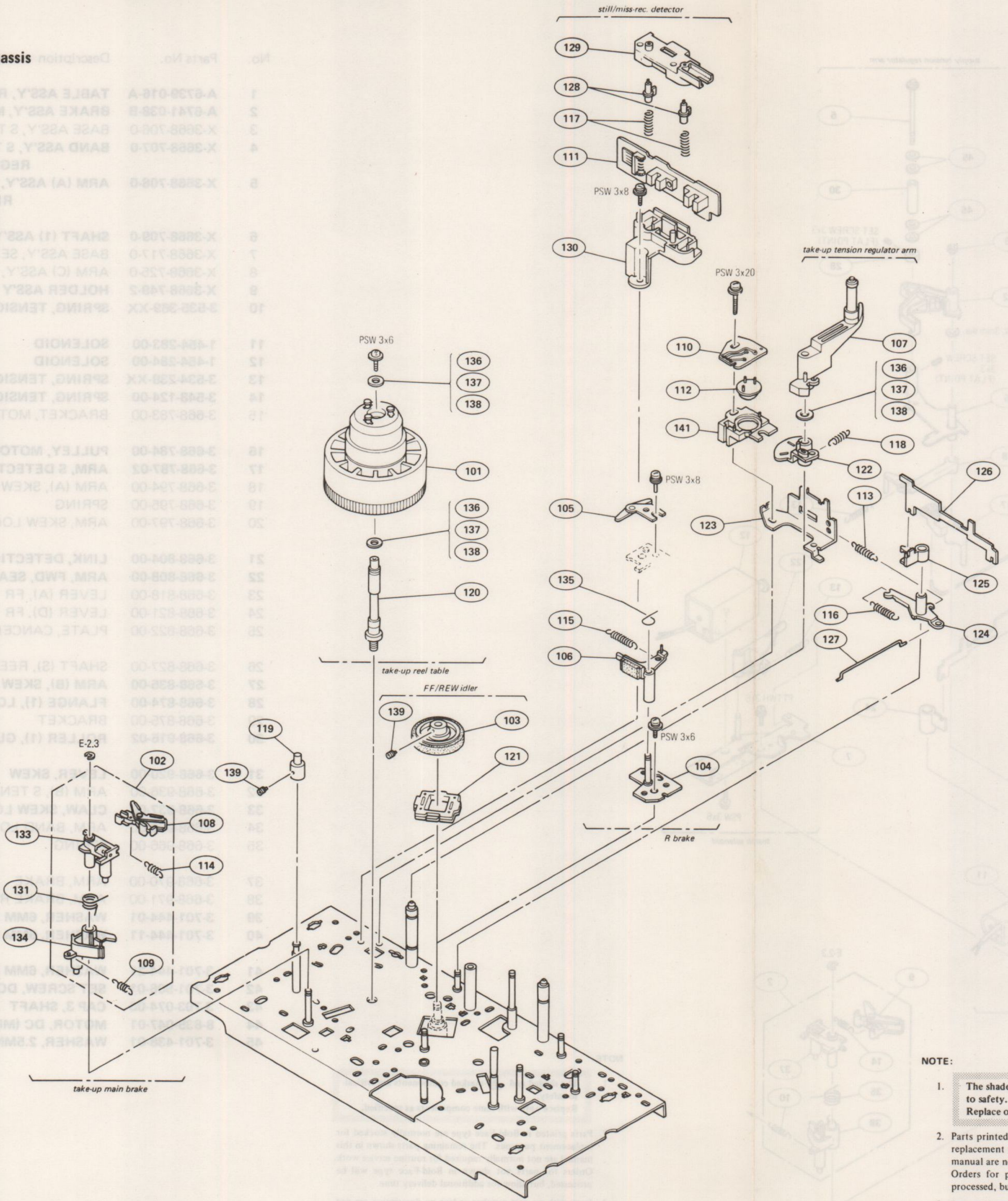
No.	Parts No.	Description
1	**A-6739-016-A**	**TABLE ASS'Y, REEL**
2	**A-6741-038-B**	**BRAKE ASS'Y, MAIN**
3	X-3668-706-0	BASE ASS'Y, S TENSION REGULATOR
4	**X-3668-707-0**	**BAND ASS'Y, S TENSION REGULATOR**
5	**X-3668-708-0**	**ARM (A) ASS'Y, S TENSION REGULATOR**
6	**X-3668-709-0**	**SHAFT (1) ASS'Y, ROLLER**
7	X-3668-717-0	BASE ASS'Y, SEARCH
8	X-3668-725-0	ARM (C) ASS'Y, SKEW
9	**X-3668-749-2**	**HOLDER ASS'Y**
10	**3-535-369-XX**	**SPRING, TENSION (12T)**
11	**1-454-283-00**	**SOLENOID**
12	**1-454-284-00**	**SOLENOID**
13	**3-534-238-XX**	**SPRING, TENSION (23T)**
14	**3-548-124-00**	**SPRING, TENSION**
15	3-668-783-00	BRACKET, MOTOR
16	**3-668-784-00**	**PULLEY, MOTOR**
17	**3-668-787-02**	**ARM, S DETECTION**
18	3-668-794-00	ARM (A), SKEW
19	3-668-795-00	SPRING
20	3-668-797-00	ARM, SKEW LOCK
21	**3-668-804-00**	**LINK, DETECTION, TENSION**
22	**3-668-808-00**	**ARM, FWD, SEARCH**
23	3-668-818-00	LEVER (A), FR
24	3-668-821-00	LEVER (D), FR
25	3-668-822-00	PLATE, CANCEL, FR
26	3-668-827-00	SHAFT (S), REEL
27	**3-668-835-00**	**ARM (B), SKEW**
28	**3-668-874-00**	**FLANGE (1), LOWER**
29	3-668-875-00	BRACKET
30	**3-668-916-02**	**ROLLER (1), GUIDE**
31	**3-668-920-00**	**LEVER, SKEW**
32	3-668-936-00	ARM (B), S TENSION REGULATOR
33	**3-668-937-00**	**CLAW, SKEW LOCK**
34	3-668-939-00	ARM, BAND LOCK
35	3-668-966-00	SPRING
37	3-668-970-00	ARM, BRAKE
38	3-668-971-00	ARM, BRAKE RELEASE
39	**3-701-444-01**	**WASHER, 6MM DIA, 0.13T**
40	**3-701-444-11**	**WASHER, 6MM DIA, 0.25T**
41	**3-701-444-21**	**WASHER, 6MM DIA, 0.5T**
42	**3-701-506-01**	**SET SCREW, DOUBLE POINT 3x4**
43	**3-703-074-00**	**CAP 3, SHAFT**
44	**8-835-047-01**	**MOTOR, DC (MNR-4000A)**
45	**3-701-438-01**	**WASHER, 2.5MM DIA, 0.13T**

NOTE:

1. **The shaded and ⚠ -marked components are critical to safety.
Replace only with same components as specified.**
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

REEL CHASSIS (2) REEL CHASSIS (2)

Take-up Side Reel Chassis

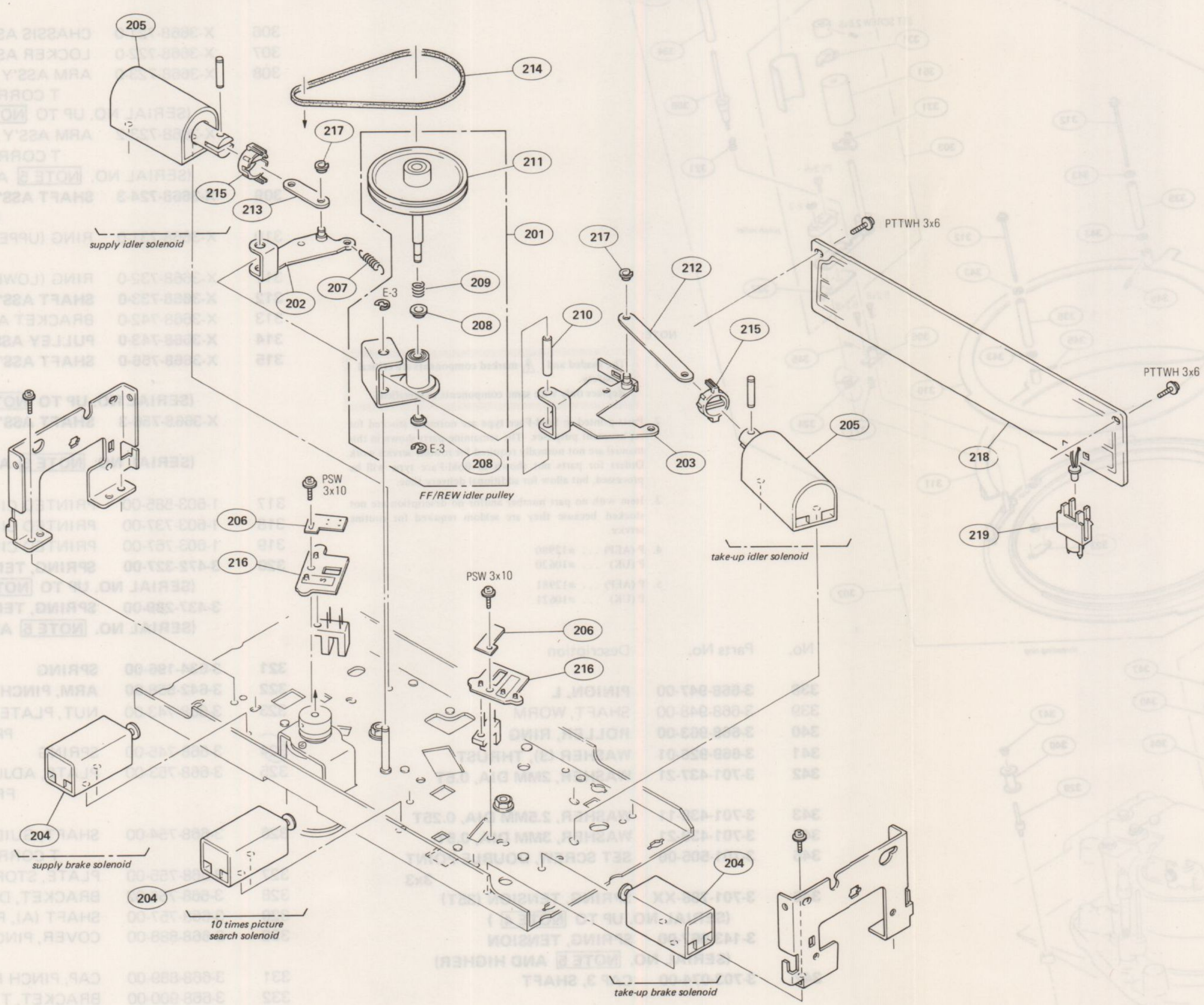

still/miss-rec. detector
129
128
117
111
PSW 3x8
130
PSW 3x20
take-up tension regulator arm
107
110
136
137
138
112
141
118
122
126
PSW 3x6
136
137
138
101
PSW 3x8
105
123
113
136
137
138
125
120
135
115
116
124
106
127
take-up reel table
FF/REW idler
139
103
121
119
E-2.3
102
139
PSW 3x6
104
108
133
114
R brake
131
134
109
take-up main brake

No.	Parts No.	Description
101	**A-6739-016-A**	**TABLE ASS'Y, REEL**
102	**A-6741-038-B**	**BRAKE ASS'Y, MAIN**
103	**X-3646-026-0**	**IDLER ASS'Y, FF**
104	X-3668-705-0	BASE ASS'Y, R BRAKE
105	X-3668-726-0	LEVER ASS'Y, R CANCEL
106	**X-3668-737-0**	**BRAKE ASS'Y, R**
107	**X-3668-738-0**	**ARM ASS'Y, T TENSION REGULATOR**
108	**X-3668-749-2**	**HOLDER ASS'Y**
109	**3-535-369-XX**	**SPRING, TENSION (12T)**
110	1-603-589-00	PRINTED CIRCUIT BOARD, PH-4
111	1-603-590-00	PRINTED CIRCUIT BOARD, SW-46
112	**1-806-232-11**	**DETECTOR TENSION**
113	**3-534-238-XX**	**SPRING, TENSION (23T)**
114	**3-548-124-00**	**SPRING, TENSION**
115	**3-549-861-00**	**SPRING, TENSION**
116	**3-630-615-XX**	**SPRING, TENSION (18T)** **(P (AEP).... S/N UP TO 13930)** **(P (UK) .... S/N UP TO 10920)**
	3-669-980-00	**SPRING, TENSION (20½T)** **(P (AEP).... S/N 13931 AND HIGHER)** **(P (UK) .... S/N 10921 AND HIGHER)**
117	**3-642-126-00**	**SPRING, COMPRESSION**
118	3-642-427-00	SPRING, TENSION
119	3-668-031-00	RETAINER (UPPER), CASSETTE
120	3-668-766-00	SHAFT (T), REEL
121	3-668-780-00	CUSHION, IDLER
122	**3-668-788-00**	**ARM, T DETECTION**
123	3-668-798-00	STOPPER, T TENSION REGULATOR
124	3-668-819-00	LEVER (B), FR
125	3-668-820-00	LEVER (C), FR
126	3-668-822-00	PLATE, CANCEL, FR
127	3-668-823-00	ROD, PULL, FR
128	**3-668-929-00**	**ACTUATOR, SR**
129	3-668-931-00	HOLDER (UPPER), SR
130	3-668-932-00	HOLDER (LOWER), SR
131	3-668-966-00	SPRING
133	3-668-970-00	ARM, BRAKE
134	3-668-971-00	ARM, BRAKE RELEASE
135	3-669-924-00	SPRING
136	**3-701-444-01**	**WASHER, 6MM DIA, 0.13T**
137	**3-701-444-11**	**WASHER, 6MM DIA, 0.25T**
138	**3-701-444-21**	**WASHER, 6MM DIA, 0.5T**
139	**3-701-506-01**	**SET SCREW, DOUBLE POINT 3x4**
141	3-668-789-00	HOLDER, BRIDGE, PHOTO

NOTE:

1. **The shaded and ⚠ -marked components are critical to safety.**
   Replace only with same components as specified.
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

Reel Chassis (bottom view)


205
214
217
211
201
215
213
supply idler solenoid
202
207
E-3
209
208
217
212
210
215
PTTWH 3x6
PTTWH 3x6
205
203
208
E-3
FF/REW idler pulley
218
219
take-up idler solenoid
PSW 3x10
206
216
PSW 3x10
206
216
204
supply brake solenoid
204
10 times picture search solenoid
204
take-up brake solenoid

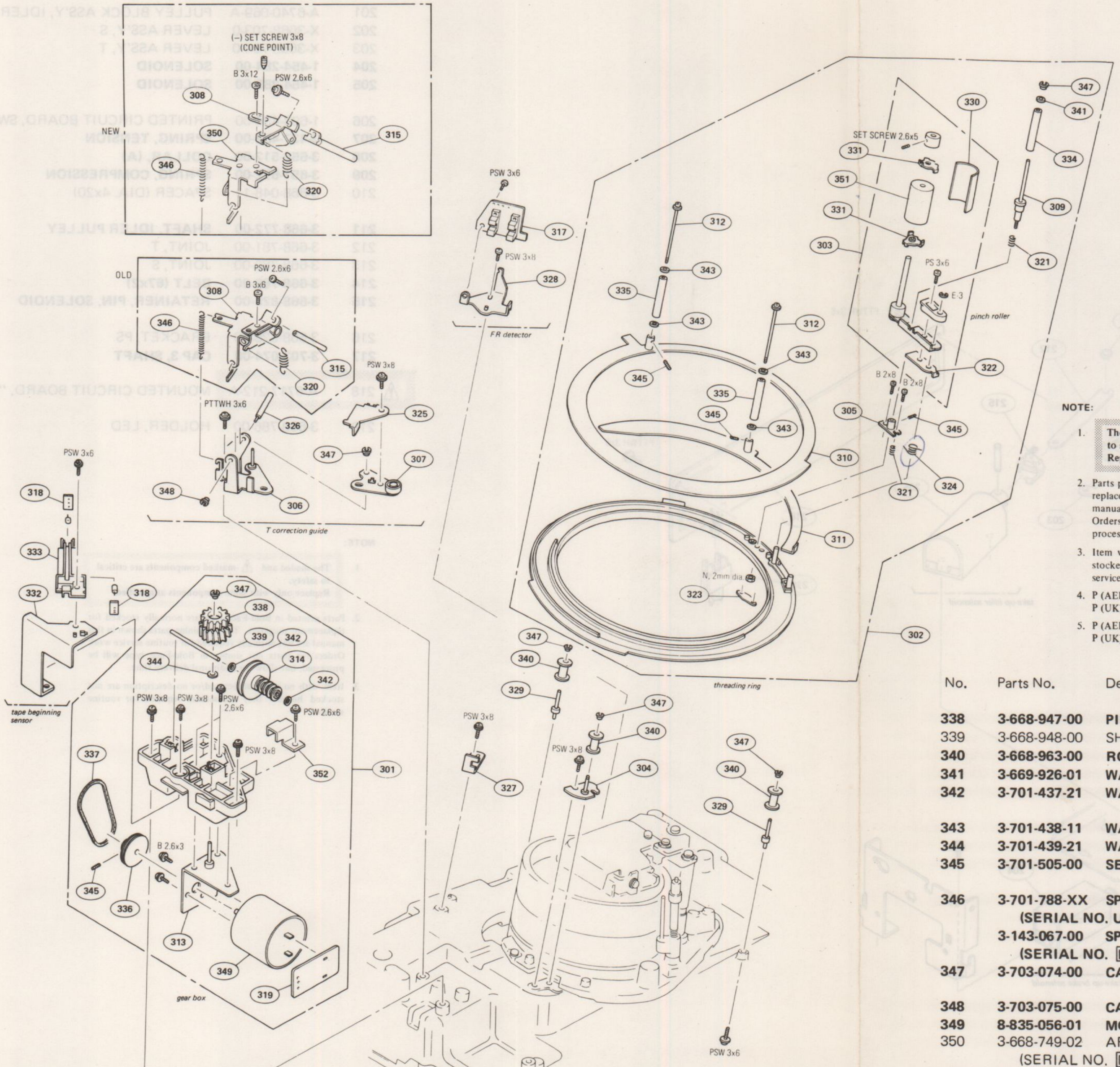
No.	Parts No.	Description
201	A-6740-069-A	PULLEY BLOCK ASS'Y, IDLER
202	X-3668-703-0	LEVER ASS'Y, S
203	X-3668-704-0	LEVER ASS'Y, T
204	**1-454-284-00**	**SOLENOID**
205	**1-454-285-00**	**SOLENOID**
206	1-603-434-00	PRINTED CIRCUIT BOARD, SW-43
207	**3-437-452-00**	**SPRING, TENSION**
208	**3-650-512-00**	**COLLAR, (A)**
209	**3-651-572-00**	**SPRING, COMPRESSION**
210	3-668-048-11	SPACER (DIA. 4x20)
211	**3-668-772-00**	**SHAFT, IDLER PULLEY**
212	3-668-781-00	JOINT, T
213	3-668-782-00	JOINT, S
214	**3-668-785-00**	**BELT (67x2)**
215	**3-668-826-00**	**RETAINER, PIN, SOLENOID**
216	3-668-828-00	BRACKET, PS
217	**3-703-074-00**	**CAP 3, SHAFT**
⚠ 218	A-6717-212-A	MOUNTED CIRCUIT BOARD, "PD-16"
219	3-668-786-00	HOLDER, LED

NOTE:

1. **The shaded and ⚠-marked components are critical to safety. Replace only with same components as specified.**
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

- 020- 6593367.-

Tape Threading Block


(−) SET SCREW 3x8
(CONE POINT)
B 3x12
PSW 2.6x6
NEW
OLD
PSW 2.6x6
B 3x6
PSW 3x6
PSW 3x8
PTTWH 3x6
FR detector
T correction guide
PSW 3x6
tape beginning sensor
PSW 3x8
PSW 3x8
PSW 2.6x6
PSW 2.6x6
PSW 3x8
B 2.6x3
gear box
SET SCREW 2.6x5
PS 3x6
E-3
pinch roller
B 2x8
B 2x8
N, 2mm dia.
threading ring
PSW 3x8
PSW 3x8
PSW 3x6
301
302
303
304
305
306
307
308
309
310
311
312
313
314
315
317
318
319
320
321
322
323
324
325
326
327
328
329
330
331
332
333
334
335
336
337
338
339
340
341
342
343
344
345
346
347
348
349
350
351
352

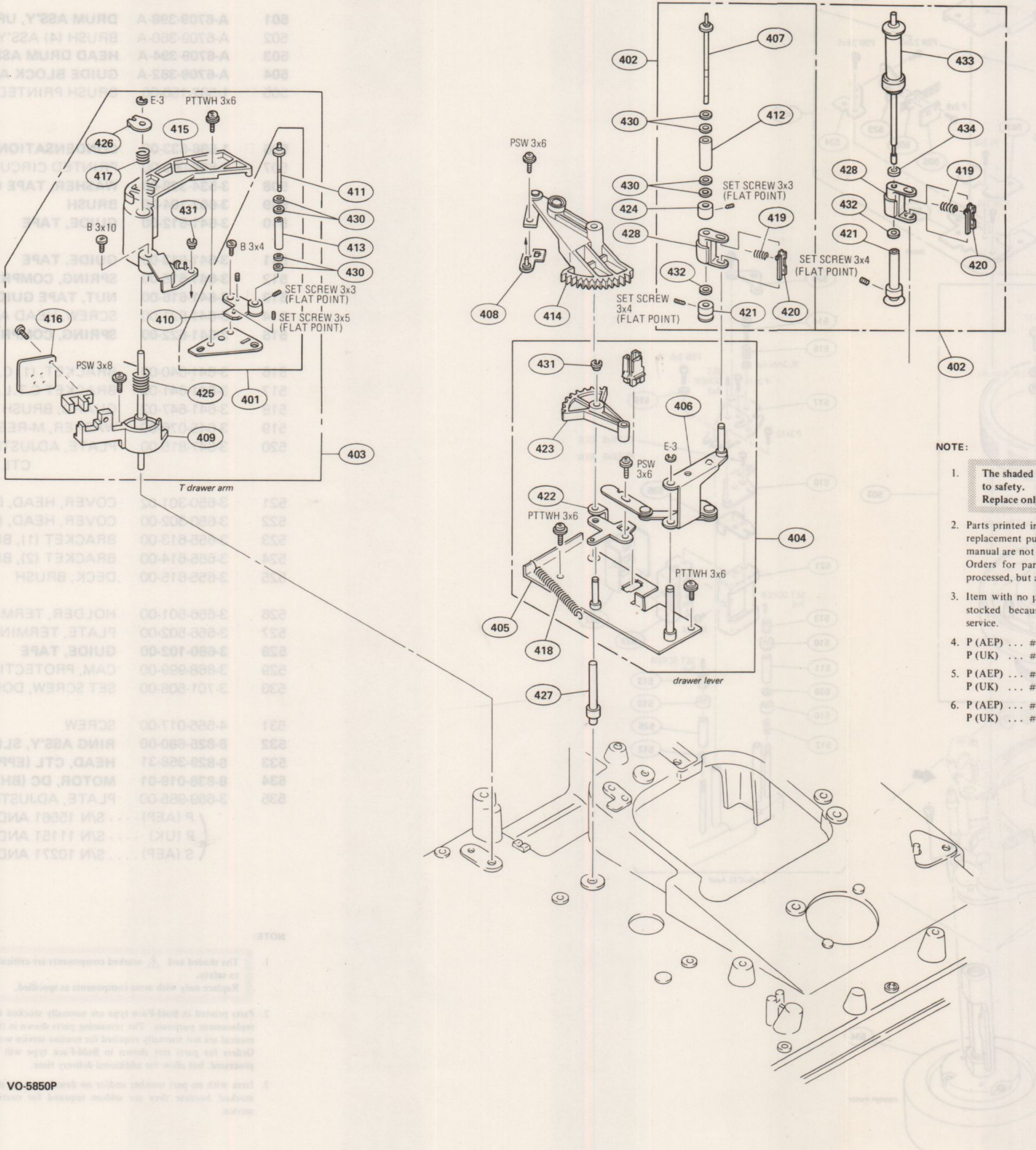
No.	Parts No.	Description
301	A-6750-134-B	BOX BLOCK ASS'Y, GEAR
302	A-6750-124-D	RING BLOCK ASS'Y, MAIN
303	**-A-6750-125-D**	**PINCH ROLLER BLOCK ASS'Y** -
304	X-3668-719-0	ROLLER ASS'Y, RING
305	X-3668-720-0	BASE ASS'Y, ROLLER, PRECEDING
306	X-3668-721-0	CHASSIS ASS'Y, GUIDE
307	X-3668-722-0	LOCKER ASS'Y, FR
308	X-3668-723-0	ARM ASS'Y, GUIDE, T CORRECTION (SERIAL NO. UP TO NOTE 4)
	X-3668-723-2	ARM ASS'Y, GUIDE, T CORRECTION (SERIAL NO. NOTE 5 AND HIGHER)
309	**X-3668-724-3**	**SHAFT ASS'Y, ROLLER, PRECEDING**
310	X-3668-731-0	RING (UPPER) ASS'Y, SUB
311	X-3668-732-0	RING (LOWER) ASS'Y, SUB
312	**X-3668-733-0**	**SHAFT ASS'Y, SR GUIDE**
313	X-3668-742-0	BRACKET ASS'Y, MOTOR
314	**X-3668-743-0**	**PULLEY ASS'Y, WORM**
315	**X-3668-756-0**	**SHAFT ASS'Y, T CORRECTION GUIDE** **(SERIAL NO. UP TO NOTE 4)**
	X-3668-756-3	**SHAFT ASS'Y, T CORRECTION GUIDE** **(SERIAL NO. NOTE 5 AND HIGHER)**
317	1-603-585-00	PRINTED CIRCUIT BOARD, FR-11
318	1-603-737-00	PRINTED CIRCUIT BOARD, PH-5
319	1-603-767-00	PRINTED CIRCUIT BOARD, LM-7
320	**3-472-327-00**	**SPRING, TENSION** **(SERIAL NO. UP TO NOTE 4)**
	3-437-289-00	**SPRING, TENSION** **(SERIAL NO. NOTE 5 AND HIGHER)**
321	**3-634-196-00**	**SPRING**
322	**3-642-558-00**	**ARM, PINCH ROLLER**
323	3-668-743-00	NUT, PLATE, ROLLER, PRECEDING
324	3-668-745-00	SPRING
325	3-668-753-00	PLATE, ADJUSTMENT, FR LOCKER
326	3-668-754-00	SHAFT, GUIDE ARM, T CORRECTION
327	3-668-755-00	PLATE, STOPPER, SR
328	3-668-756-02	BRACKET, DETECTION, FR
329	3-668-757-00	SHAFT (A), RING ROLLER
330	3-668-888-00	COVER, PINCH
331	3-668-889-00	CAP, PINCH ROLLER
332	3-668-900-00	BRACKET, T SENSOR
333	**3-668-901-00**	**HOLDER, T PHOTO**
334	**3-668-917-00**	**ROLLER, PRECEDING**
335	**3-668-919-00**	**ROLLER, SR GUIDE**
336	**3-668-945-00**	**PULLEY, LM**
337	**3-668-946-00**	**BELT (38.5x1.8), SQUARE**

No.	Parts No.	Description
338	**3-668-947-00**	**PINION, L**
339	3-668-948-00	SHAFT, WORM
340	**3-668-963-00**	**ROLLER, RING**
341	**3-669-926-01**	**WASHER (3), THRUST**
342	**3-701-437-21**	**WASHER, 2MM DIA, 0.5T**
343	**3-701-438-11**	**WASHER, 2.5MM DIA, 0.25T**
344	**3-701-439-21**	**WASHER, 3MM DIA, 0.5T**
345	**3-701-505-00**	**SET SCREW, DOUBLE POINT 3x3**
346	**3-701-788-XX**	**SPRING, TENSION (35T)** **(SERIAL NO. UP TO NOTE 4)**
	3-143-067-00	**SPRING, TENSION** **(SERIAL NO. NOTE 5 AND HIGHER)**
347	**3-703-074-00**	**CAP 3, SHAFT**
348	**3-703-075-00**	**CAP 2, SHAFT**
349	**8-835-056-01**	**MOTOR, DC (DNR-1002A)**
350	3-668-749-02	ARM (A), GUIDE, T CORRECTION (SERIAL NO. NOTE 5 AND HIGHER)
351	**X-3668-758-3**	**PINCH ROLLER ASS'Y**
352	3-669-960-00	RETAINER, SHAFT

NOTE:

1. **The shaded and ⚠-marked components are critical to safety. Replace only with same components as specified.**
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.
4. P (AEP) ... #12980
   P (UK) ... #10620
5. P (AEP) ... #12981
   P (UK) ... #10621

Supply and Take-up Threading Arms


OLD
S drawer arm
NEW
407
402
433
412
430
434
428
419
430
SET SCREW 3x3 (FLAT POINT)
424
432
419
421
428
SET SCREW 3x4 (FLAT POINT)
420
432
SET SCREW 3x4 (FLAT POINT)
421
420
402
PSW 3x6
408
414
E-3
PTTWH 3x6
415
426
417
411
431
430
B 3x10
413
B 3x4
430
SET SCREW 3x3 (FLAT POINT)
416
410
SET SCREW 3x5 (FLAT POINT)
PSW 3x8
425
401
409
403
T drawer arm
431
406
423
E-3
PSW 3x6
422
PTTWH 3x6
404
PTTWH 3x6
405
418
drawer lever
427

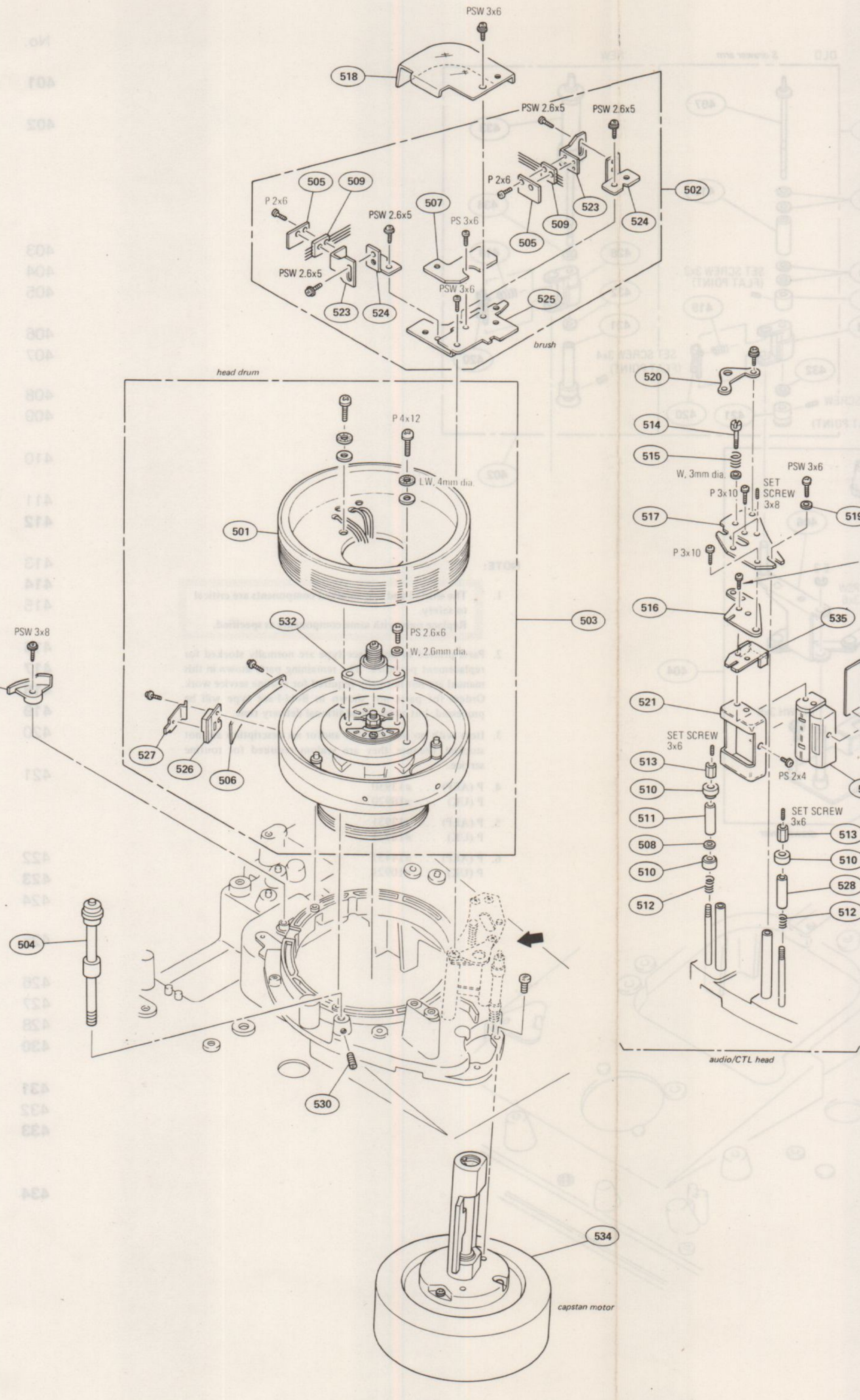
NOTE:

1. **The shaded and ⚠ -marked components are critical to safety. Replace only with same components as specified.**
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.
4. P (AEP) ... #13930
   P (UK) ... #10920
5. P (AEP) ... #13931
   P (UK) ... #10921
6. P (AEP) ... #14431
   P (UK) ... #10921

VO-5850P

No.	Parts No.	Description
401	**A-6746-020-A**	**ROLLER BLOCK ASS'Y, T GUIDE**
402	**A-6746-021-B**	**ROLLER BLOCK ASS'Y, S DRAWER** **(SERIAL NO. UP TO NOTE 4)**
	A-6746-026-A	**ROLLER BLOCK ASS'Y, S DRAWER** **(SERIAL NO. NOTE 5 AND HIGHER)**
403	A-6750-121-A	ARM BLOCK ASS'Y, T DRAWER
404	A-6750-122-A	ARM BLOCK ASS'Y, S DRAWER
405	X-3668-710-0	BASE ASS'Y, ARM, S DRAWER
406	X-3668-711-0	ARM ASS'Y, S DRAWER
407	X-3668-712-0	SHAFT (2) ASS'Y, ROLLER (SERIAL NO. UP TO NOTE 4)
408	X-3668-713-0	LINK (B) ASS'Y, DRIVING
409	X-3668-714-0	RETAINER ASS'Y, ARM, T DRAWER
410	X-3668-715-0	PLATE ASS'Y, GUIDE, T
411	X-3668-716-0	SHAFT (3) ASS'Y, ROLLER
412	**X-3668-718-0**	**GUIDE ASS'Y, TAPE** **(SERIAL NO. UP TO NOTE 4)**
413	X-3668-727-0	GUIDE ASS'Y, TAPE
414	**X-3668-729-0**	**LEVER ASS'Y, DRAWER**
415	X-3668-741-0	ARM ASS'Y, T DRAWER
416	1-603-435-00	PRINTED CIRCUIT BOARD, SW-50
417	**3-534-854-00**	**SPRING, COMPRESSION**
418	**3-540-506-00**	**SPRING, TENSION**
419	**3-644-718-00**	**SPRING, COMPRESSION**
420	3-668-718-00	RETAINER, SPRING, S DRAWER
421	3-668-719-00	HOLDER (L), S GUIDE (SERIAL NO. UP TO NOTE 4)
	3-669-974-00	HOLDER (L), S GUIDE (SERIAL NO. NOTE 5 AND HIGHER)
422	3-668-720-00	LIMITER, S DRAWER
423	**3-668-721-00**	**ARM, S DRIVING**
424	3-668-724-00	FLANGE (2), LOWER (SERIAL NO. UP TO NOTE 4)
425	3-668-734-00	SPRING
426	3-668-735-00	RETAINER, SPRING
427	3-668-760-00	SHAFT, DRAWER LEVER
428	3-668-833-00	HOLDER (M), GUIDE
430	**3-701-438-01**	**WASHER, 2.5MM DIA, 0.13T**
431	**3-703-074-00**	**CAP 3, SHAFT**
432	3-669-946-00	RING, O
433	**A-6746-025-A**	**ROLLER BLOCK ASS'Y (1), S DRAWER** **(SERIAL NO. NOTE 5 AND HIGHER)**
434	**7-688-001-11**	**W2, MIDDLE** **(SERIAL NO. NOTE 6 AND HIGHER)**

Drum Block and Capstan

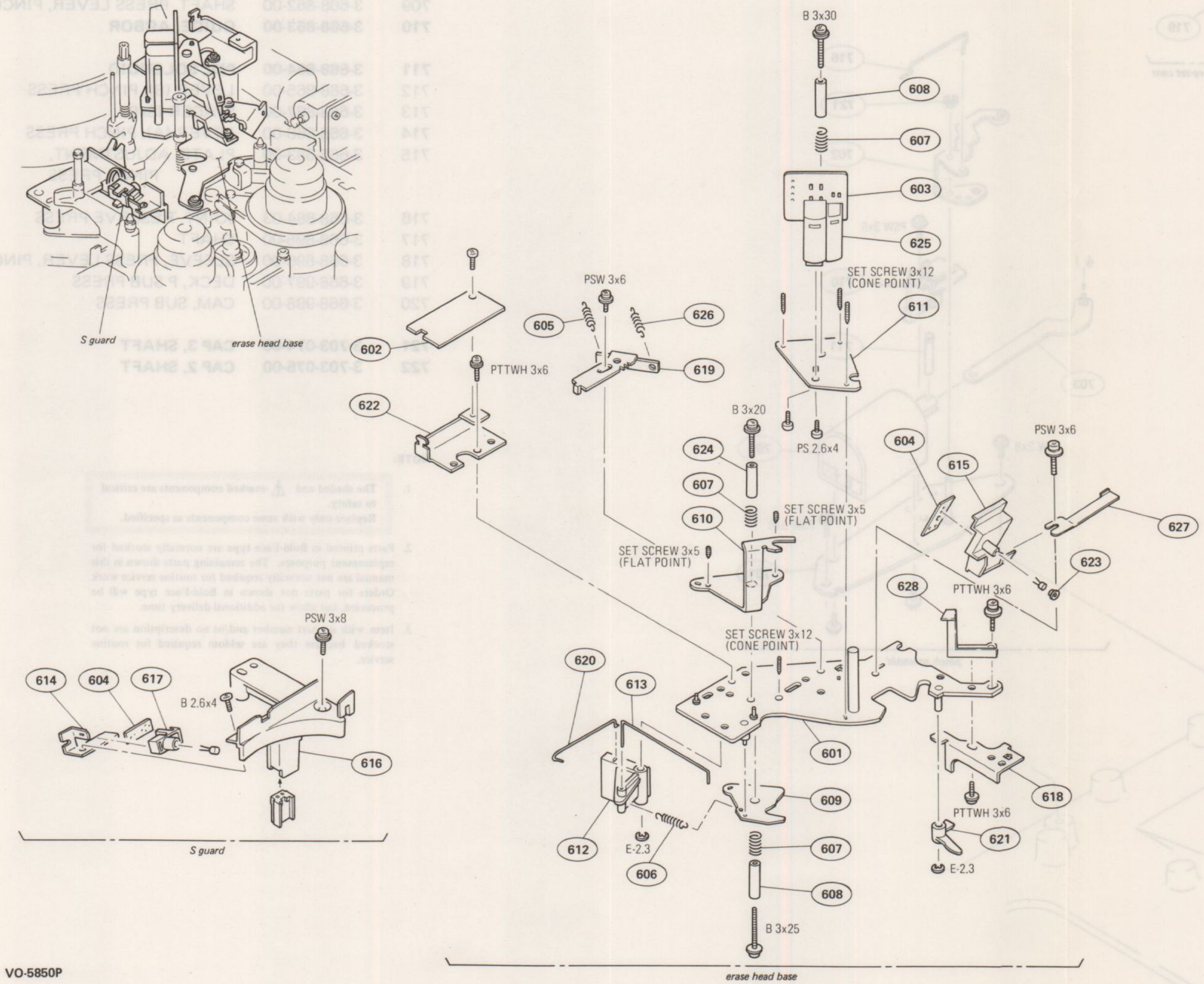

PSW 3x6
518
PSW 2.6x5
PSW 2.6x5
505
509
P 2x6
P 2x6
507
PSW 2.6x5
PS 3x6
502
523
524
509
505
PSW 2.6x5
523
524
PSW 3x6
525
brush
head drum
P 4x12
LW. 4mm dia.
501
503
532
PS 2.6x6
W, 2.6mm dia.
PSW 3x8
529
527
526
506
504
530
534
capstan motor
520
514
515
W, 3mm dia.
SET SCREW 3x8
PSW 3x6
P 3x10
517
519
P 3x10
PS 2.6x6 OLD
PS 2.6x8 NEW
516
535
521
SET SCREW 3x6
513
510
511
508
510
512
PS 2x4
522
533
SET SCREW 3x6
513
510
528
512
audio/CTL head

No.	Parts No.	Description
501	**A-6709-398-A**	**DRUM ASS'Y, UPPER, DUR-24-R**
502	A-6709-360-A	BRUSH (4) ASS'Y
503	**A-6709-394-A**	**HEAD DRUM ASS'Y, DUH-24A-R**
504	**A-6709-382-A**	**GUIDE BLOCK ASS'Y, TAPE**
505	1-582-150-00	BRUSH PRINTED CIRCUIT BOARD
506	**1-586-633-00**	**CONDENSATION, SENSOR**
507	1-604-063-00	PRINTED CIRCUIT BOARD, SP-14
508	**3-534-329-00**	**WASHER, TAPE GUIDE**
509	**3-607-104-00**	**BRUSH**
510	**3-641-612-00**	**GUIDE, TAPE**
511	**3-641-613-00**	**GUIDE, TAPE**
512	**3-641-615-00**	**SPRING, COMPRESSION**
513	**3-641-616-00**	**NUT, TAPE GUIDE ADJUSTMENT**
514	3-641-621-00	SCREW, HEAD ADJUSTING
515	**3-641-622-00**	**SPRING, COMPRESSION**
516	3-641-640-00	BRACKET, (1) C.T.L. HEAD
517	3-641-641-02	BRACKET C.T.L. HEAD, (2)
518	3-641-647-02	GUARD, BRUSH
519	3-645-076-00	WASHER, M-REEL S
520	3-647-815-00	PLATE, ADJUSTMENT, CTL HEAD
521	3-650-301-02	COVER, HEAD, D-CTL
522	3-650-302-00	COVER, HEAD, (REAR)
523	3-655-613-00	BRACKET (1), BRUSH
524	3-655-614-00	BRACKET (2), BRUSH
525	3-655-615-00	DECK, BRUSH
526	3-656-501-00	HOLDER, TERMINAL
527	3-656-502-00	PLATE, TERMINAL
528	**3-660-102-00**	**GUIDE, TAPE**
529	3-668-999-00	CAM, PROTECTION
530	3-701-508-00	SET SCREW, DOUBLE POINT 3x6
531	4-555-017-00	SCREW
532	**8-825-680-00**	**RING ASS'Y, SLIP**
533	**8-829-358-31**	**HEAD, CTL (EPP150-5803B)**
534	**8-838-019-01**	**MOTOR, DC (BHF-1600A)**
535	3-669-985-00	PLATE, ADJUSTMENT (P (AEP) . . . . S/N 15561 AND HIGHER P (UK) . . . . S/N 11151 AND HIGHER S (AEP) . . . . S/N 10271 AND HIGHER)

NOTE:

1. **The shaded and ⚠-marked components are critical to safety. Replace only with same components as specified.**
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

Erase Head Base and S Guard


S guard
erase head base
B 3x30
608
607
603
625
SET SCREW 3x12 (CONE POINT)
611
PSW 3x6
605
626
602
PTTWH 3x6
619
622
B 3x20
PS 2.6x4
624
607
610
SET SCREW 3x5 (FLAT POINT)
SET SCREW 3x5 (FLAT POINT)
604
615
PSW 3x6
627
623
628
PTTWH 3x6
SET SCREW 3x12 (CONE POINT)
PSW 3x8
614
604
617
B 2.6x4
616
620
613
601
609
618
PTTWH 3x6
621
612
E-2.3
606
607
608
E-2.3
B 3x25
S guard
erase head base

VO-5850P

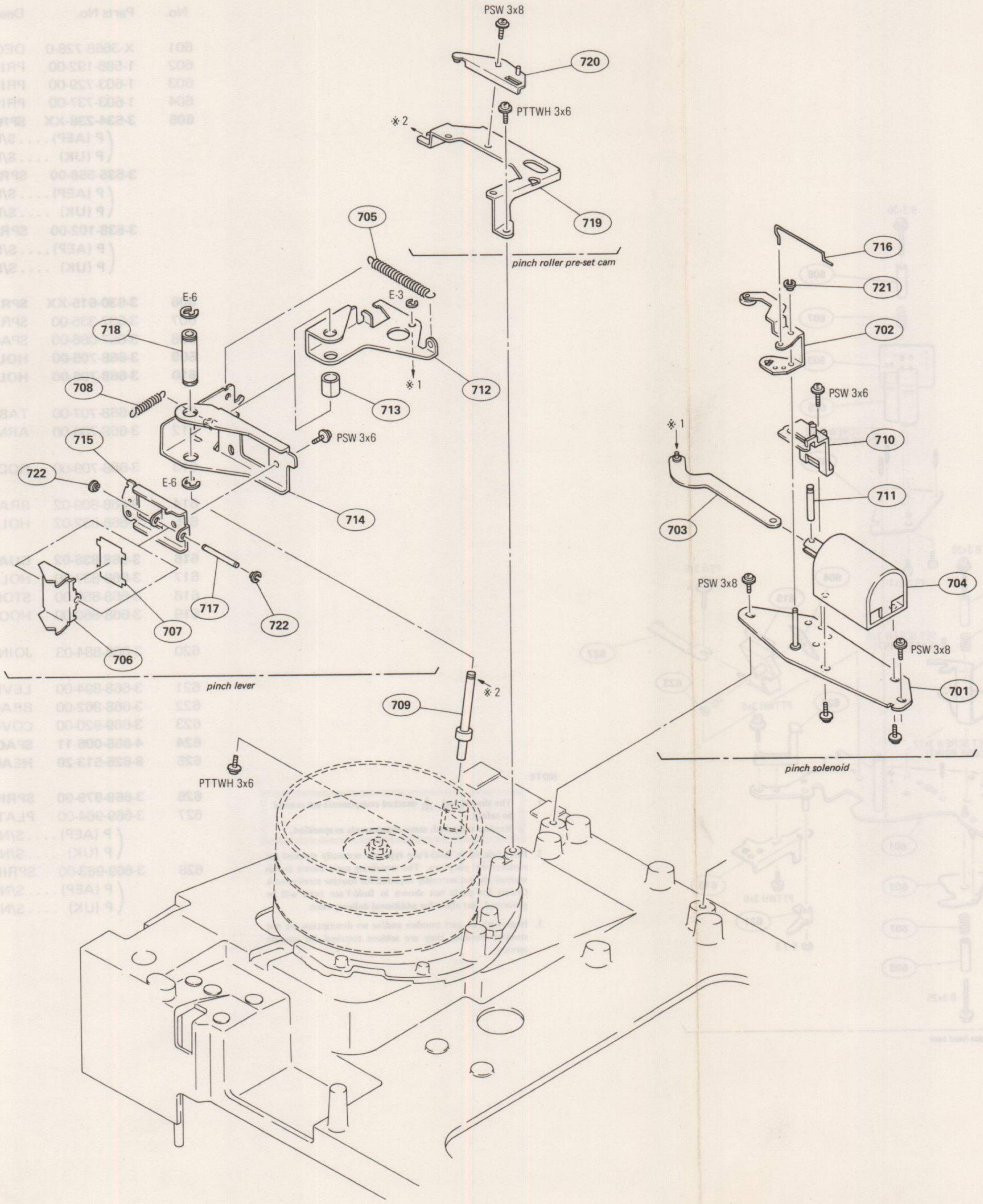
No.	Parts No.	Description
601	X-3668-728-0	DECK ASS'Y, E HEAD
602	1-586-192-00	PRINTED CIRCUIT BOARD, AH-3
603	1-603-729-00	PRINTED CIRCUIT BOARD, EC-19
604	1-603-737-00	PRINTED CIRCUIT BOARD, PH-5
605	**3-534-238-XX**	**SPRING, TENSION (23T)**
		(P (AEP) . . . . S/N UP TO 13930)
		(P (UK) . . . . S/N UP TO 10920)
	3-535-558-00	**SPRING, TENSION**
		(P (AEP) . . . . S/N 13931 ~ 14630)
		(P (UK) . . . . S/N 10921 ~ 11020)
	3-538-102-00	**SPRING, TENSION**
		(P (AEP) . . . . S/N 14631 AND HIGHER)
		(P (UK) . . . . S/N 11021 AND HIGHER)
606	**3-630-615-XX**	**SPRING, TENSION (18T)**
607	3-637-335-00	SPRING, COMPRESSION
608	3-657-086-00	SPACER (3-20)
609	**3-668-705-00**	**HOLDER (LOWER), S**
610	**3-668-706-00**	**HOLDER (UPPER), S**
611	3-668-707-00	TABLE, HEAD, E
612	3-668-708-00	ARM, DRIVING, CORRECTION GUIDE
613	3-668-709-00	ROD, PULL, CORRECTION GUIDE
614	3-668-809-02	BRACKET, HOLDER
615	3-668-832-02	HOLDER (S)
616	**3-668-836-02**	**GUARD, S**
617	3-668-837-00	HOLDER, LED
618	3-668-859-00	STOPPER, RING
619	3-668-860-00	HOOK, SPRING, TENSION REGULATOR
620	3-668-884-03	JOINT, RESERVE PRESS
621	3-668-894-00	LEVER, RELEASE
622	3-668-962-00	BRACKET, AH PC BOARD
623	3-669-920-00	COVER, S PHOTO
624	**4-855-006-11**	**SPACER, PIPE**
625	**8-825-513-20**	**HEAD, CTL ERASE (EPP170-58)**
626	**3-669-979-00**	**SPRING, TENSION**
627	3-669-964-00	PLATE, GROUND
		(P (AEP) . . . . S/N 12531 AND HIGHER)
		(P (UK) . . . . S/N 10621 AND HIGHER)
628	3-669-963-00	SPRING, LEAF, GROUND
		(P (AEP) . . . . S/N 11081 AND HIGHER)
		(P (UK) . . . . S/N 10221 AND HIGHER)

NOTE:

1. **The shaded and ⚠ -marked components are critical to safety. Replace only with same components as specified.**
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

PINCH LEVER PINCH LEVER

Pinch Lever and Pinch Solenoid

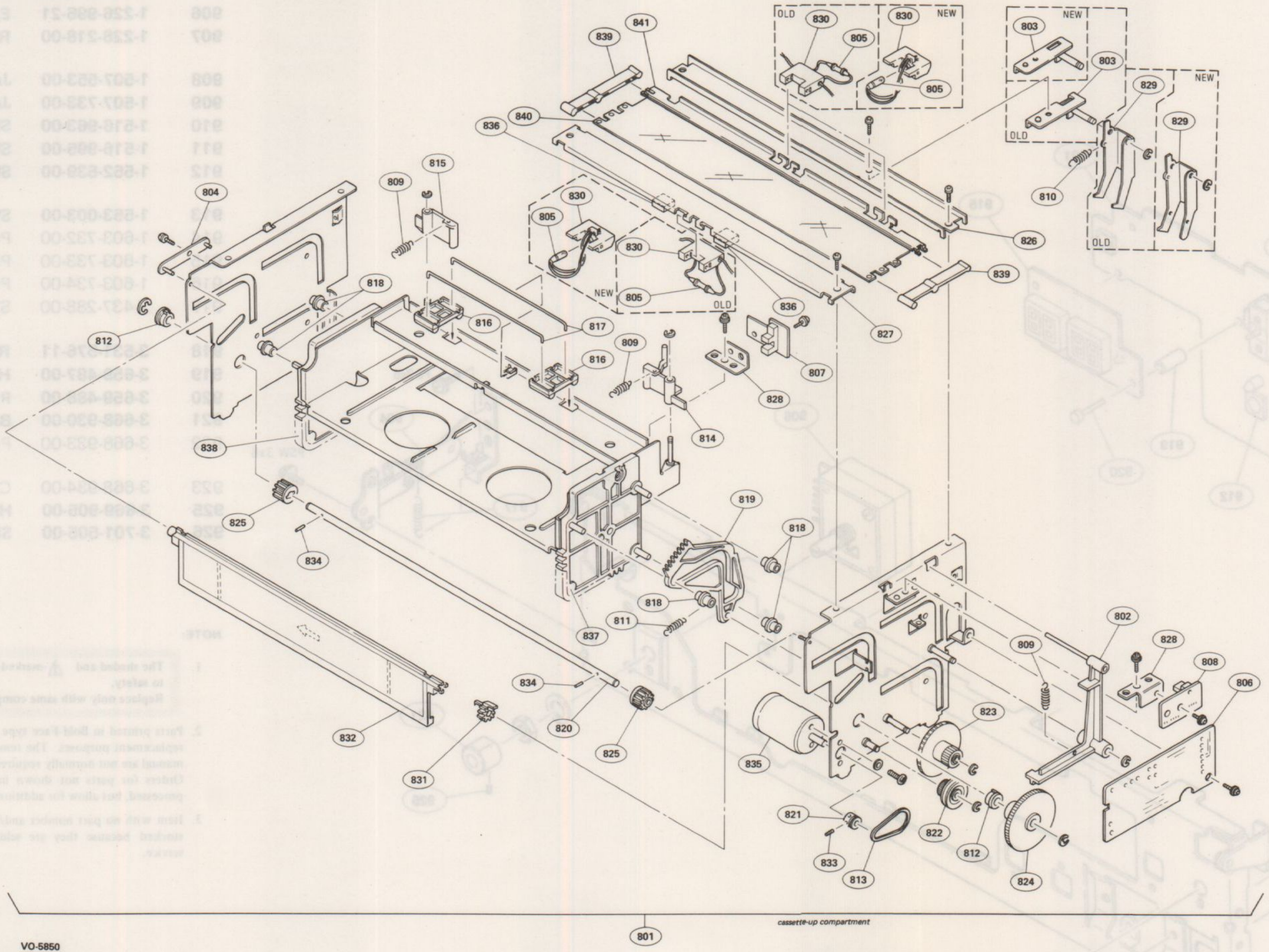

PSW 3x8
720
PTTWH 3x6
※2
719
pinch roller pre-set cam
705
E-6
E-3
718
712
※1
713
708
PSW 3x6
715
722
E-6
714
717
722
707
706
pinch lever
709
※2
PTTWH 3x6
716
721
702
PSW 3x6
※1
710
711
703
PSW 3x8
704
PSW 3x8
701
pinch solenoid

No.	Parts No.	Description
701	X-3668-734-0	BASE ASS'Y, PINCH PRESS
702	X-3668-735-3	LEVER ASS'Y, RESERVE PRESS
703	X-3668-736-0	JOINT ASS'Y
704	**1-454-286-00**	**SOLENOID**
705	3-610-265-02	SPRING
706	3-642-518-00	LEVER, PINCH
707	3-642-519-00	SPRING
708	3-645-392-00	SPRING, TENSION
709	3-668-862-00	SHAFT, PRESS LEVER, PINCH
710	**3-668-863-00**	**GUIDE, ARBOR**
711	**3-668-864-00**	**PIN, SOLENOID**
712	3-668-865-00	LEVER (B), PINCH PRESS
713	3-668-867-00	SPACER (8x9)
714	3-668-868-00	LEVER (A), PINCH PRESS
715	3-668-883-00	PLATE, ADJUSTMENT, PINCH PRESS
716	3-668-884-03	JOINT, RESERVE PRESS
717	3-668-895-00	SHAFT
718	3-668-896-00	SLEEVE, PRESS LEVER, PINCH
719	3-668-997-00	DECK, P SUB PRESS
720	3-668-998-00	CAM, SUB PRESS
721	**3-703-074-00**	**CAP 3, SHAFT**
722	**3-703-075-00**	**CAP 2, SHAFT**

NOTE:

1. **The shaded and ⚠-marked components are critical to safety. Replace only with same components as specified.**
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

Cassette-up Compartment



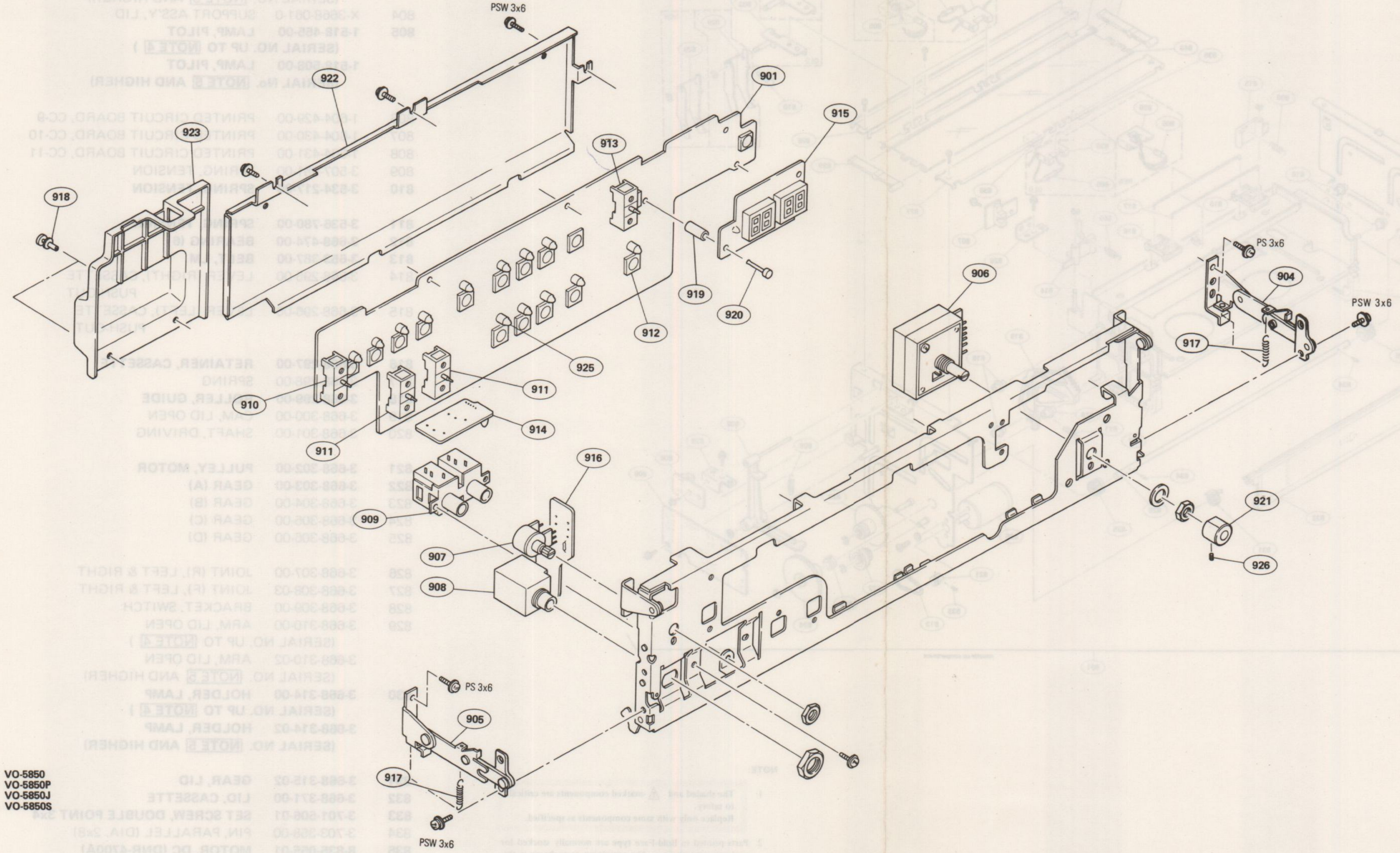
VO-5850
VO-5850J
VO-5850P

NOTE:

1. **The shaded and ⚠-marked components are critical to safety. Replace only with same components as specified.**
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.
4. P (AEP) ... #12980
   P (UK) ... #10620
5. P (AEP) ... #12981
   P (UK) ... #10621

No.	Parts No.	Description
801	**A-6751-104-C**	**CASSETTE-UP ASS'Y**
802	**X-3668-059-0**	**ARM ASS'Y, SWITCH, DOWN**
803	X-3668-060-0	HOLDER ASS'Y, ARM (SERIAL NO. UP TO NOTE 4)
	X-3668-060-3	HOLDER ASS'Y, ARM (SERIAL NO. NOTE 5 AND HIGHER)
804	X-3668-061-0	SUPPORT ASS'Y, LID
805	**1-518-455-00**	**LAMP, PILOT** **(SERIAL NO. UP TO NOTE 4)**
	1-518-508-00	**LAMP, PILOT** **(SERIAL No. NOTE 5 AND HIGHER)**
806	1-604-429-00	PRINTED CIRCUIT BOARD, CC-9
807	1-604-430-00	PRINTED CIRCUIT BOARD, CC-10
808	1-604-431-00	PRINTED CIRCUIT BOARD, CC-11
809	3-507-051-00	SPRING, TENSION
810	**3-534-217-00**	**SPRING, TENSION**
811	**3-536-780-00**	**SPRING, TENSION**
812	**3-668-474-00**	**BEARING (6)**
813	**3-653-387-00**	**BELT, LM**
814	3-668-295-00	LEVER (RIGHT), CASSETTE PUSH-OUT
815	3-668-296-00	LEVER (LEFT), CASSETTE PUSH-OUT
816	**3-668-297-00**	**RETAINER, CASSETTE**
817	3-668-298-00	SPRING
818	**3-668-299-00**	**ROLLER, GUIDE**
819	3-668-300-00	CAM, LID OPEN
820	3-668-301-00	SHAFT, DRIVING
821	**3-668-302-00**	**PULLEY, MOTOR**
822	**3-668-303-00**	**GEAR (A)**
823	3-668-304-00	GEAR (B)
824	3-668-305-00	GEAR (C)
825	3-668-306-00	GEAR (D)
826	3-668-307-00	JOINT (R), LEFT & RIGHT
827	3-668-308-03	JOINT (F), LEFT & RIGHT
828	3-668-309-00	BRACKET, SWITCH
829	3-668-310-00	ARM, LID OPEN (SERIAL NO. UP TO NOTE 4)
	3-668-310-02	ARM, LID OPEN (SERIAL NO. NOTE 5 AND HIGHER)
830	**3-668-314-00**	**HOLDER, LAMP** **(SERIAL NO. UP TO NOTE 4)**
	3-668-314-02	**HOLDER, LAMP** **(SERIAL NO. NOTE 5 AND HIGHER)**
831	**3-668-315-02**	**GEAR, LID**
832	**3-668-371-00**	**LID, CASSETTE**
833	**3-701-506-01**	**SET SCREW, DOUBLE POINT 3x4**
834	3-703-358-00	PIN, PARALLEL (DIA. 2x8)
835	**8-835-055-01**	**MOTOR, DC (DNR-4700A)**
836	3-672-926-00	CUSHION, LID (SERIAL NO. NOTE 5 AND HIGHER)
837	**X-3668-057-0**	**CASECON ASS'Y, RACK (RIGHT)**
838	**X-3668-058-0**	**CASECON ASS'Y, RACK (LEFT)**
839	**3-668-313-02**	**FRAME, SUPPORT, REFLECTOR**
840	**3-672-604-11**	**REFLECTOR**
841	**3-672-639-03**	**BRACKET, LAMP**

Function Control



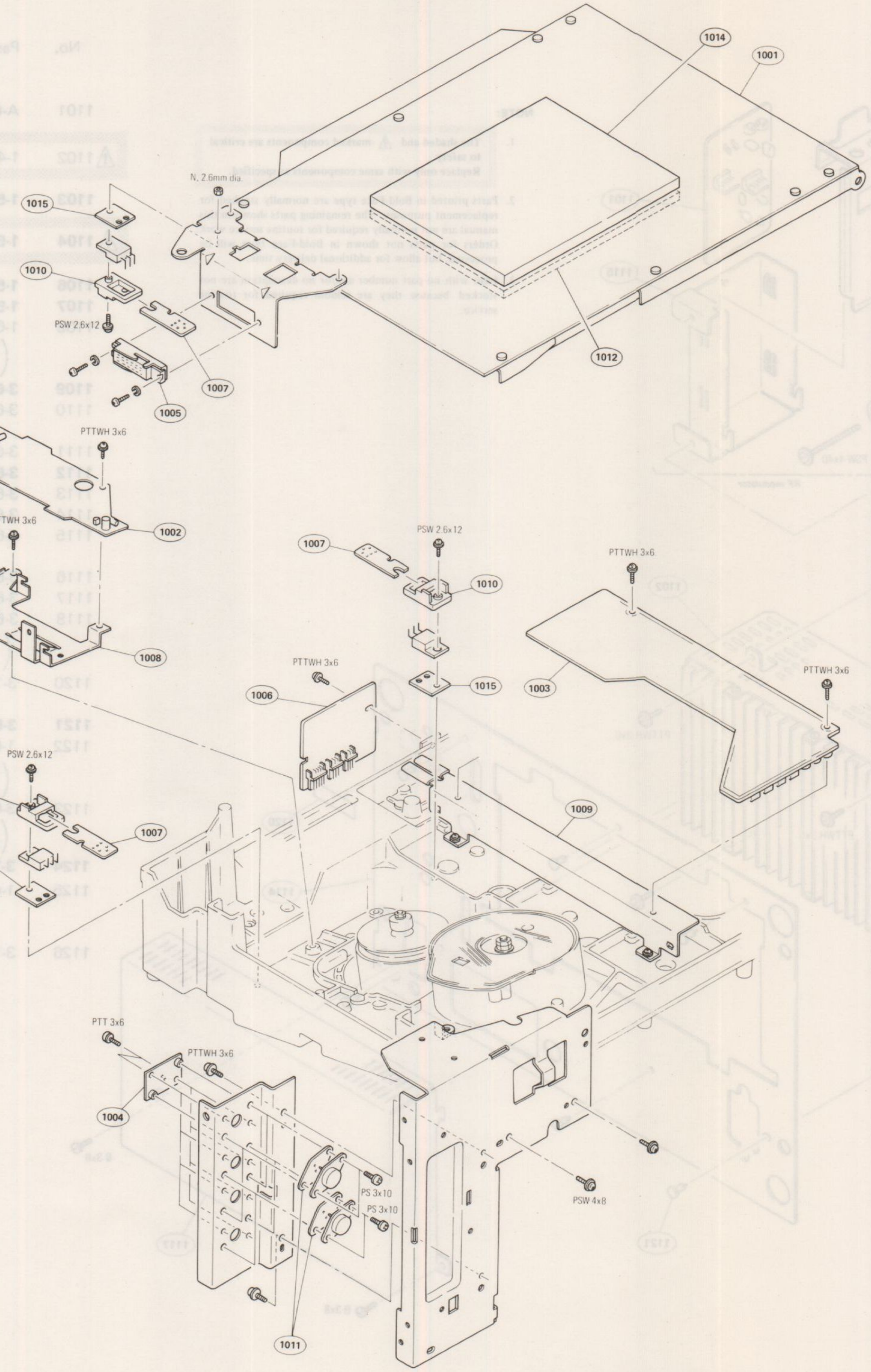
VO-5850
VO-5850P
VO-5850J
VO-5850S

No.	Parts No.	Description
901	A-6728-271-A	MOUNTED CIRCUIT BOARD, KY-13A
904	X-3668-766-0	STAY (RIGHT) ASS'Y, LOCK
905	X-3668-765-0	STAY (LEFT) ASS'Y, LOCK
906	**1-226-996-21**	**ENCODER, ROTARY**
907	**1-228-218-00**	**R, VAR, CARBON 500/500**
908	**1-507-553-00**	**JACK**
909	**1-507-733-00**	**JACK**
910	**1-516-963-00**	**SWITCH, LEVER SLIDE**
911	**1-516-995-00**	**SWITCH, LEVER SLIDE**
912	**1-552-539-00**	**SWITCH, KEY BOARD**
913	**1-553-003-00**	**SWITCH, LEVER SLIDE**
914	1-603-732-00	PRINTED CIRCUIT BOARD, MI-3
915	1-603-733-00	PRINTED CIRCUIT BOARD, DP-10
916	1-603-734-00	PRINTED CIRCUIT BOARD, HP-3
917	3-437-288-00	SPRING, TENSION
918	**3-531-576-11**	**RIVET**
919	**3-659-487-00**	**HOLDER, BUZZER**
920	**3-659-488-00**	**PIN, BUZZER HOLDER**
921	**3-668-930-00**	**BOSS, FITTING, KNOB**
922	3-668-933-00	PLATE, BOTTOM, KEYBOARD
923	3-668-934-00	COVER, MICROPHONE JACK
925	**3-669-905-00**	**HOLDER, LAMP**
926	**3-701-505-00**	**SET SCREW, DOUBLE POINT 3x3**

NOTE:

1. The shaded and ⚠-marked components are critical to safety. Replace only with same components as specified.
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

Chassis (bottom view)

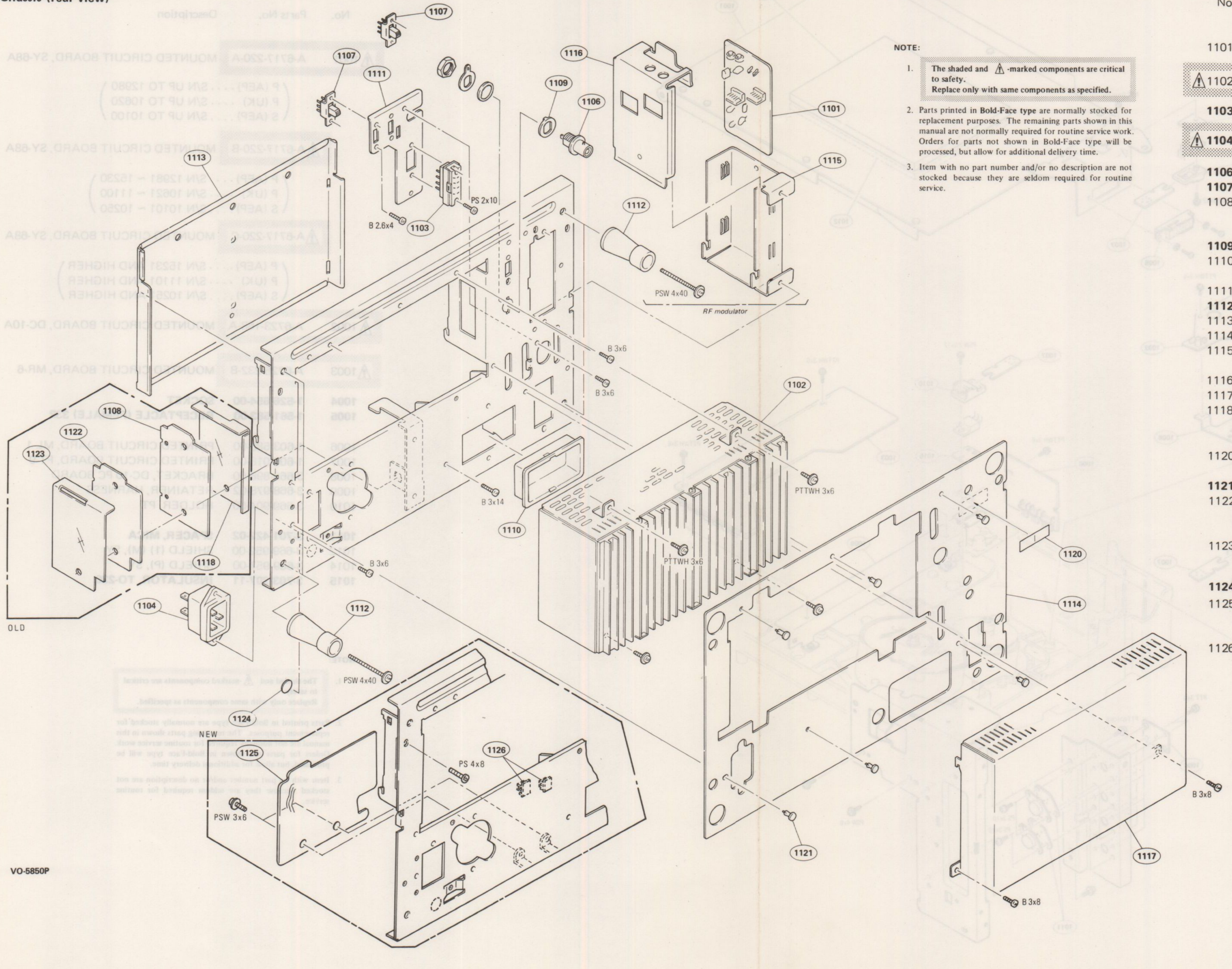

1014
1001
N, 2.6mm dia
1015
1010
PSW 2.6x12
1012
1007
1005
PTTWH 3x6
1002
PTTWH 3x6
1008
1007
PSW 2.6x12
1010
PTTWH 3x6
1003
PTTWH 3x6
PTTWH 3x6
1006
1015
PSW 2.6x12
1010
1007
1015
1009
PTT 3x6
PTTWH 3x6
1004
PS 3x10
PS 3x10
PSW 4x8
1011

No.	Parts No.	Description
⚠1001	A-6717-220-A	MOUNTED CIRCUIT BOARD, SY-68A P (AEP) . . . . S/N UP TO 12980 P (UK) . . . . S/N UP TO 10620 S (AEP) . . . . S/N UP TO 10100
	⚠A-6717-220-B	MOUNTED CIRCUIT BOARD, SY-68A P (AEP) . . . . S/N 12981 ~ 15230 P (UK) . . . . S/N 10621 ~ 11100 S (AEP) . . . . S/N 10101 ~ 10250
	⚠A-6717-220-C	MOUNTED CIRCUIT BOARD, SY-68A P (AEP) . . . . S/N 15231 AND HIGHER P (UK) . . . . S/N 11101 AND HIGHER S (AEP) . . . . S/N 10251 AND HIGHER
⚠1002	A-6723-168-A	MOUNTED CIRCUIT BOARD, DC-10A
⚠1003	A-6725-232-B	MOUNTED CIRCUIT BOARD, MR-6
1004	**1-526-654-00**	**SOCKET**
1005	**1-561-583-00**	**RECEPTACLE (FEMALE) 33P**
1006	1-603-588-00	PRINTED CIRCUIT BOARD, ML-1
1007	1-605-018-00	PRINTED CIRCUIT BOARD, PT-9
1008	3-668-898-00	BRACKET, DC-10 PC BOARD
1009	3-668-978-02	RETAINER, HARNESS
1010	3-669-904-00	HOLDER, PT
1011	**3-701-422-02**	**SPACER, MICA**
1012	3-669-959-00	SHIELD (1) (M), SY
1014	3-669-957-00	SHIELD (P), SY
1015	**3-703-207-11**	**INSULATOR, TO-220**

NOTE:

1. **The shaded and ⚠-marked components are critical to safety. Replace only with same components as specified.**
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

Chassis (rear view)


1107
1107
1111
1116
1109
1106
1101
1113
1115
PS 2x10
B 2.6x4
1103
1112
PSW 4x40
RF modulator
B 3x6
B 3x6
1102
1108
1122
1123
B 3x14
PTTWH 3x6
1110
PTTWH 3x6
1120
1118
B 3x6
1112
1114
1104
OLD
PSW 4x40
1124
NEW
1125
1126
PS 4x8
PSW 3x6
B 3x8
1121
1117
B 3x8

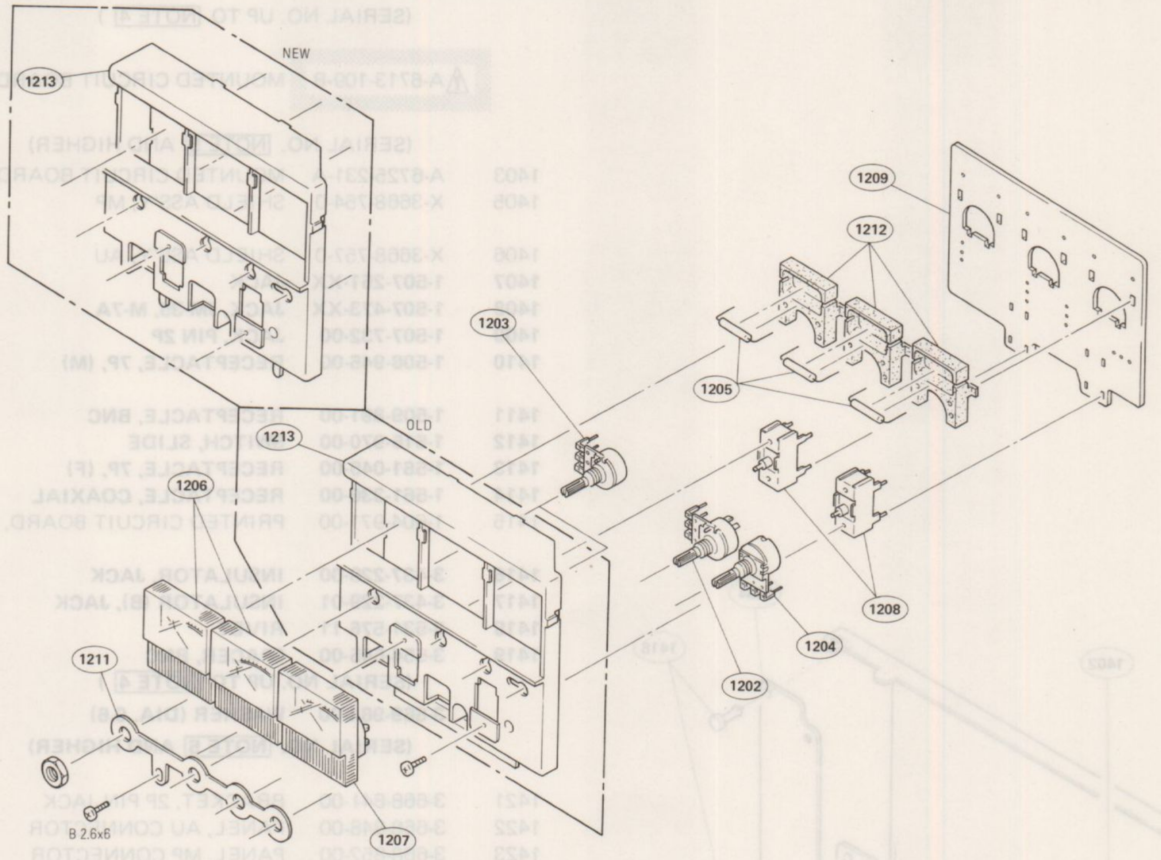
NOTE:

1. **The shaded and ⚠ -marked components are critical to safety.**
   Replace only with same components as specified.
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

No.	Parts No.	Description
1101	A-6711-276-A	MOUNTED CIRCUIT BOARD, RE-5
⚠1102	1-413-075-00	SWITCHING REGULATOR (UR-02)
1103	**1-509-095-00**	**RECEPTACLE, 8P FEMALE "TV"**
⚠**1104**	**1-509-546-00**	**3P INLET**
1106	**1-509-891-00**	**RECEPTACLE, BNC**
1107	**1-516-779-XX**	**SLIDE SWITCH**
1108	1-603-728-00	PRINTED CIRCUIT BOARD, AC-27 (P(AEP) . . . . S/N UP TO 17010 P(UK) . . . . . S/N UP TO 11350)
1109	**3-654-545-00**	**SPACER, BNC**
1110	3-668-814-00	ESCUTCHEON, CONNECTOR
1111	3-668-842-00	PLATE, CONNECTOR, SUB
1112	**3-668-924-00**	**FOOT, REAR**
1113	3-668-926-00	SHIELD, SW-REG
1114	3-669-911-00	PLATE (EU), ORNAMENTAL
1115	3-668-960-00	BRACKET, RE
1116	3-668-961-00	PLATE, SHIELD, RE
1117	3-668-989-00	COVER, SWITCH REGULATOR
1118	3-669-941-00	PROTECTOR (U), AC (P(AEP) . . . . S/N UP TO 17010 P(UK) . . . . . S/N UP TO 11350)
1120	3-703-082-31	LABEL, CAUTION
1121	**3-531-576-11**	**RIVET, NYLON, 3.5**
1122	1-605-661-00	PRINT CIRCUIT BOARD, AC-36 (P(AEP) . . . . S/N UP TO 17010 P(UK) . . . . . S/N UP TO 11350)
1123	3-669-940-00	PROTECTOR (P), AC (P(AEP) . . . . S/N UP TO 17010 P(UK) . . . . . S/N UP TO 11350)
1124	**3-701-699-00**	**LABEL, GROUND TERMINAL**
1125	1-606-380-00	PRINTED CIRCUIT BOARD, AC-35 (P(AEP) . . . . S/N 17011 AND HIGHER P(UK) . . . . S/N 11351 AND HIGHER)
1126	3-703-072-00	HOLDER, PCB (P(AEP) . . . . S/N 17011 AND HIGHER P(UK) . . . . S/N 11351 AND HIGHER)

METER PANEL   CHASSIS (3)

Meter Panel



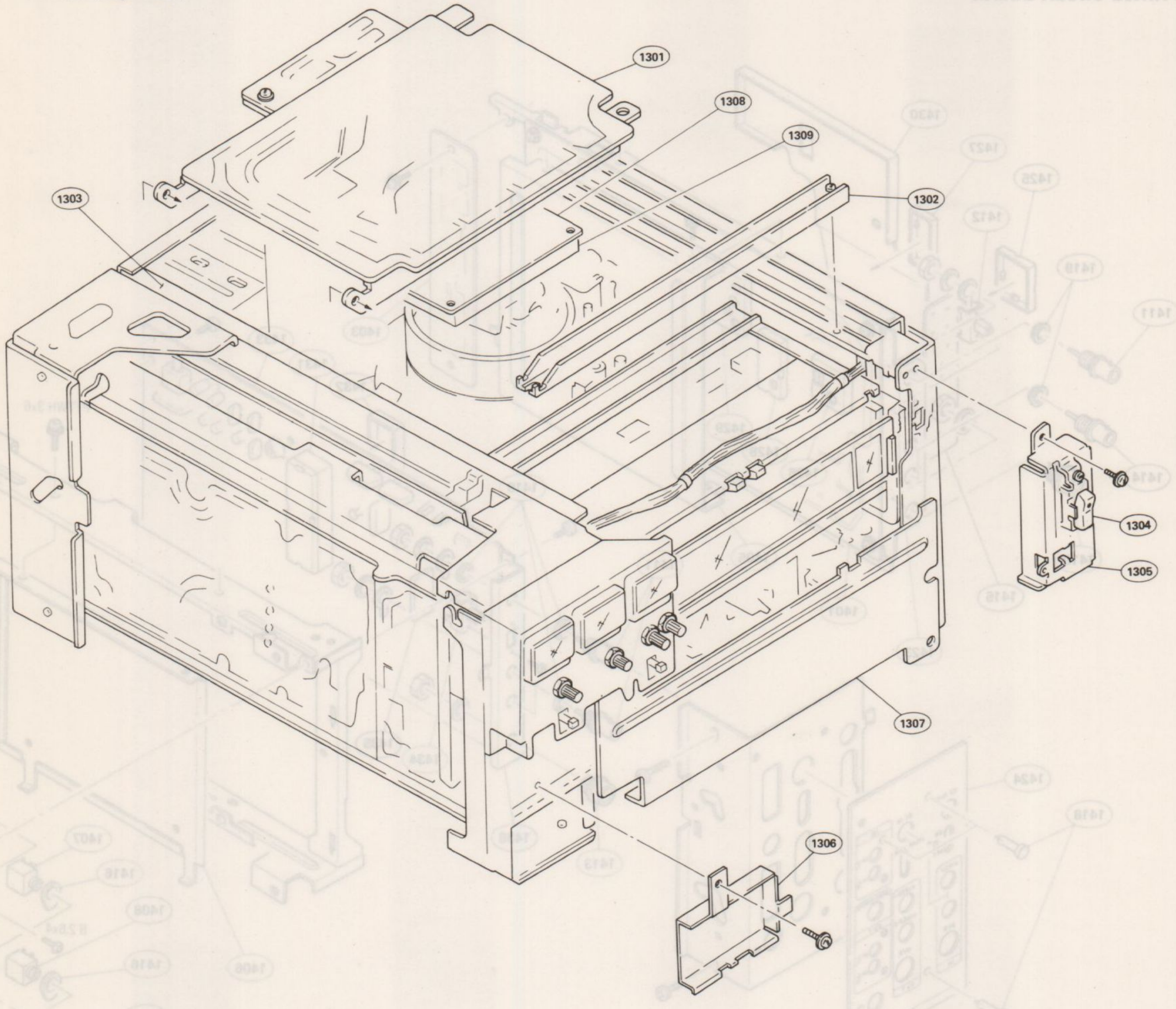
VO-5850   VO-5850S
VO-5850P
VO-5850J

No.	Parts No.	Description
1202	**1-224-525-00**	**R, VAR, CARBON 10K**
1203	**1-226-395-00**	**R, VAR, CARBON 20K**
1204	**1-226-983-00**	**R, VAR, CARBON 100K**
1205	**1-518-462-00**	**LAMP, PILOT**
1206	**1-520-393-00**	**METER, AUDIO**
1207	**1-520-440-00**	**METER, VIDEO**
1208	**1-553-003-00**	**SWITCH, LEVER SLIDE**
1209	1-604-970-00	PRINTED CIRCUIT BOARD, MC-17
1211	3-668-824-00	PLATE (E), GROUND
1212	**3-668-825-00**	**HOLDER, LAMP**
1213	3-668-840-00	PANEL (E), METER (P (AEP) . . . . S/N UP TO 12530 S/N 12831 ~ 12980 P (UK) . . . . S/N UP TO 10620)
	3-668-840-03	PANEL (E), METER (P (AEP) . . . . S/N 12531 ~ 12830 S/N 12981 AND HIGHER P (UK) . . . . S/N 10621 AND HIGHER)

NOTE:

1. **The shaded and ⚠ -marked components are critical to safety. Replace only with same components as specified.**
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

Chassis (top view)



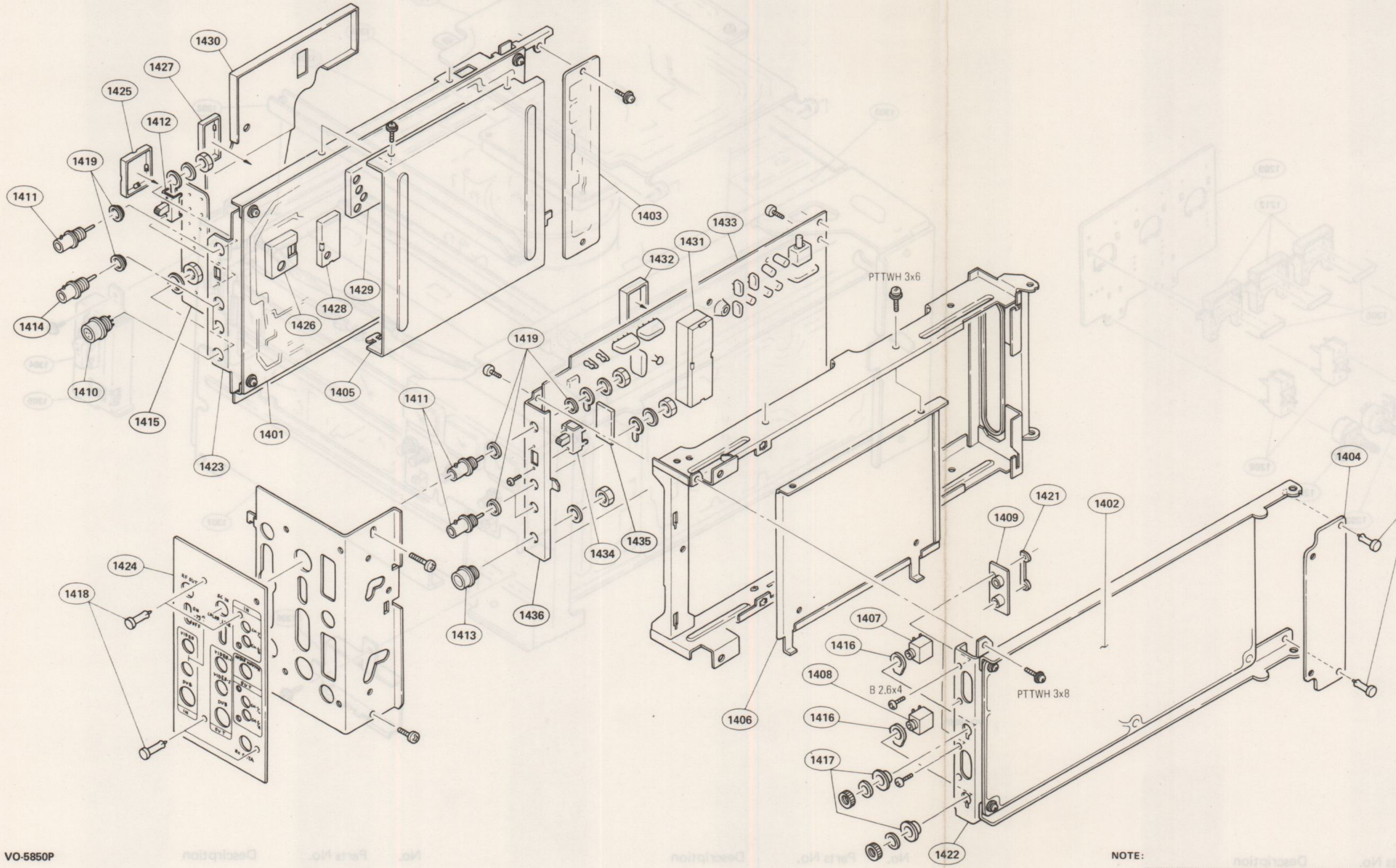
VO-5850P

No.	Parts No.	Description
⚠1301	A-6715-122-A	MOUNTED CIRCUIT BOARD, SV-31A
1302	**A-6730-439-A**	**BRACKET ASS'Y**
1303	X-3668-739-3	BEAM ASS'Y, LEFT
⚠1304	**1-553-159-00**	**SWITCH, ROCKER**
1305	3-668-811-00	BRACKET, SWITCH, POWER
1306	3-668-965-00	PLATE, SHIELD
1307	3-668-977-00	FRAME, FRONT
1308	A-6715-123-A	MOUNTED CIRCUIT BOARD, CF-7 (P (AEP) . . . . S/N UP TO 14430 P (UK) . . . . S/N UP TO 10920)
	A-6715-180-A	MOUNTED CIRCUIT BOARD, CF-10 (P (AEP) . . . . S/N 14431 AND HIGHER P (UK) . . . . S/N 10921 AND HIGHER)
1309	3-669-934-00	SHIELD, CF

NOTE:

1. **The shaded and ⚠ -marked components are critical to safety. Replace only with same components as specified.**
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

Printed Circuit Boards



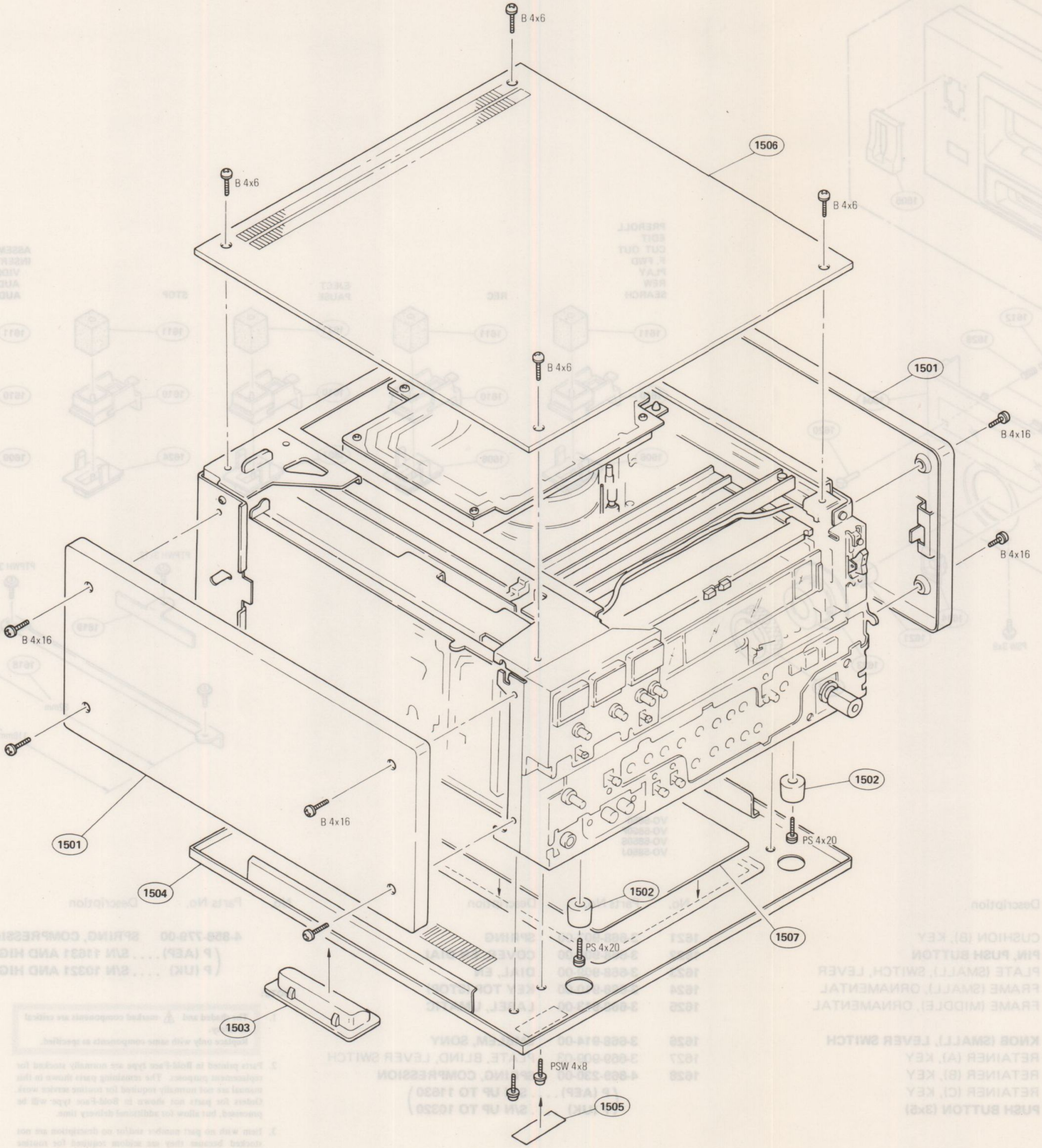
VO-5850P

No.	Parts No.	Description
1401	A-6711-287-A	MOUNTED CIRCUIT BOARD, MP-12A
⚠1402	A-6713-109-A	MOUNTED CIRCUIT BOARD, AU-21
		(SERIAL NO. UP TO NOTE 4)
	⚠A-6713-109-B	MOUNTED CIRCUIT BOARD, AU-21
		(SERIAL NO. NOTE 5 AND HIGHER)
1403	A-6725-231-A	MOUNTED CIRCUIT BOARD, BS-3
1405	X-3668-754-0	SHIELD ASS'Y, MP
1406	X-3668-757-0	SHIELD ASS'Y, AU
1407	**1-507-251-XX**	**JACK**
1408	**1-507-473-XX**	**JACK, JM-35, M-7A**
1409	**1-507-732-00**	**JACK, PIN 2P**
1410	**1-508-945-00**	**RECEPTACLE, 7P, (M)**
1411	**1-509-891-00**	**RECEPTACLE, BNC**
1412	**1-516-970-00**	**SWITCH, SLIDE**
1413	**1-561-045-00**	**RECEPTACLE, 7P, (F)**
1414	**1-561-336-00**	**RECEPTACLE, COAXIAL**
1415	1-604-971-00	PRINTED CIRCUIT BOARD, CB-6
1416	**3-437-228-00**	**INSULATOR, JACK**
1417	**3-437-229-01**	**INSULATOR (B), JACK**
1418	**3-531-576-11**	**RIVET**
1419	**3-654-545-00**	**SPACER, BNC**
		(SERIAL NO. UP TO NOTE 4)
	3-669-984-00	**WASHER (DIA. 9.6)**
		(SERIAL NO. NOTE 5 AND HIGHER)
1421	3-668-841-00	BRACKET, 2P PIN JACK
1422	3-668-848-00	PANEL, AU CONNECTOR
1423	3-668-852-00	PANEL, MP CONNECTOR
		(SERIAL NO. UP TO NOTE 4)
	3-668-852-04	PANEL, MP CONNECTOR
		(SERIAL NO. NOTE 5 AND HIGHER)
1424	3-668-956-11	PLATE (E), ORNAMENTAL, REAR (L)
1425	3-668-982-00	SHIELD (M), PO
1426	3-668-984-00	SHIELD (P), PO
1427	3-668-985-00	LID (M), SHIELD, LO
1428	3-668-987-00	LID (P), SHIELD, LO
1429	3-669-915-00	SHIELD (P), RP
1430	3-669-917-03	SHIELD (M), RP
1431	3-669-921-00	SHIELD (M), RO
1432	3-669-923-00	SHIELD (P), RO
⚠1433	A-6711-288-A	MOUNTED CIRCUIT BOARD, "DM-22A"
1434	**1-514-633-00**	**SWITCH, SLIDE**
1435	1-604-058-00	PRINTED CIRCUIT BOARD, CL-4
1436	3-668-853-00	PANEL, DM CONNECTOR
		(SERIAL NO. UP TO NOTE 4)
	3-668-853-03	PANEL, DM CONNECTOR
		(SERIAL NO. NOTE 5 AND HIGHER)

NOTE:

1. **The shaded and ⚠ -marked components are critical to safety. Replace only with same components as specified.**
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.
4. P (AEP) ... #15230
   P (UK) ... #11100
5. P (AEP) ... #15231
   P (UK) ... #11101

Ornamental Panel


B 4x6
B 4x6
B 4x6
B 4x6
1506
1501
B 4x16
B 4x16
B 4x16
B 4x16
1501
1502
PS 4x20
1502
PS 4x20
1504
1507
1503
PSW 4x8
1505

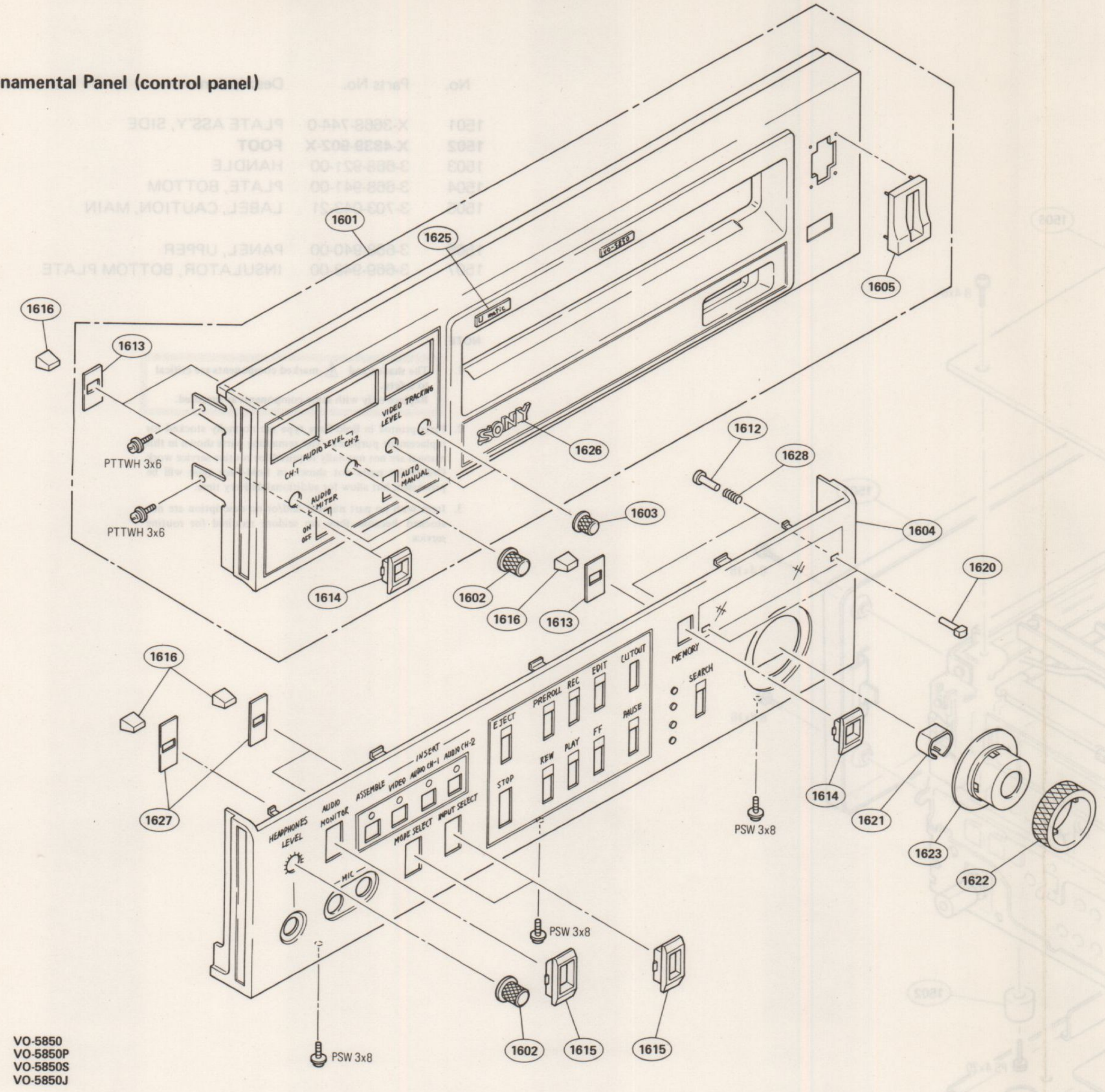
No.	Parts No.	Description
1501	X-3668-744-0	PLATE ASS'Y, SIDE
1502	**X-4839-902-X**	**FOOT**
1503	3-668-921-00	HANDLE
1504	3-668-941-00	PLATE, BOTTOM
1505	3-703-043-21	LABEL, CAUTION, MAIN
1506	3-668-940-00	PANEL, UPPER
1507	3-669-948-00	INSULATOR, BOTTOM PLATE

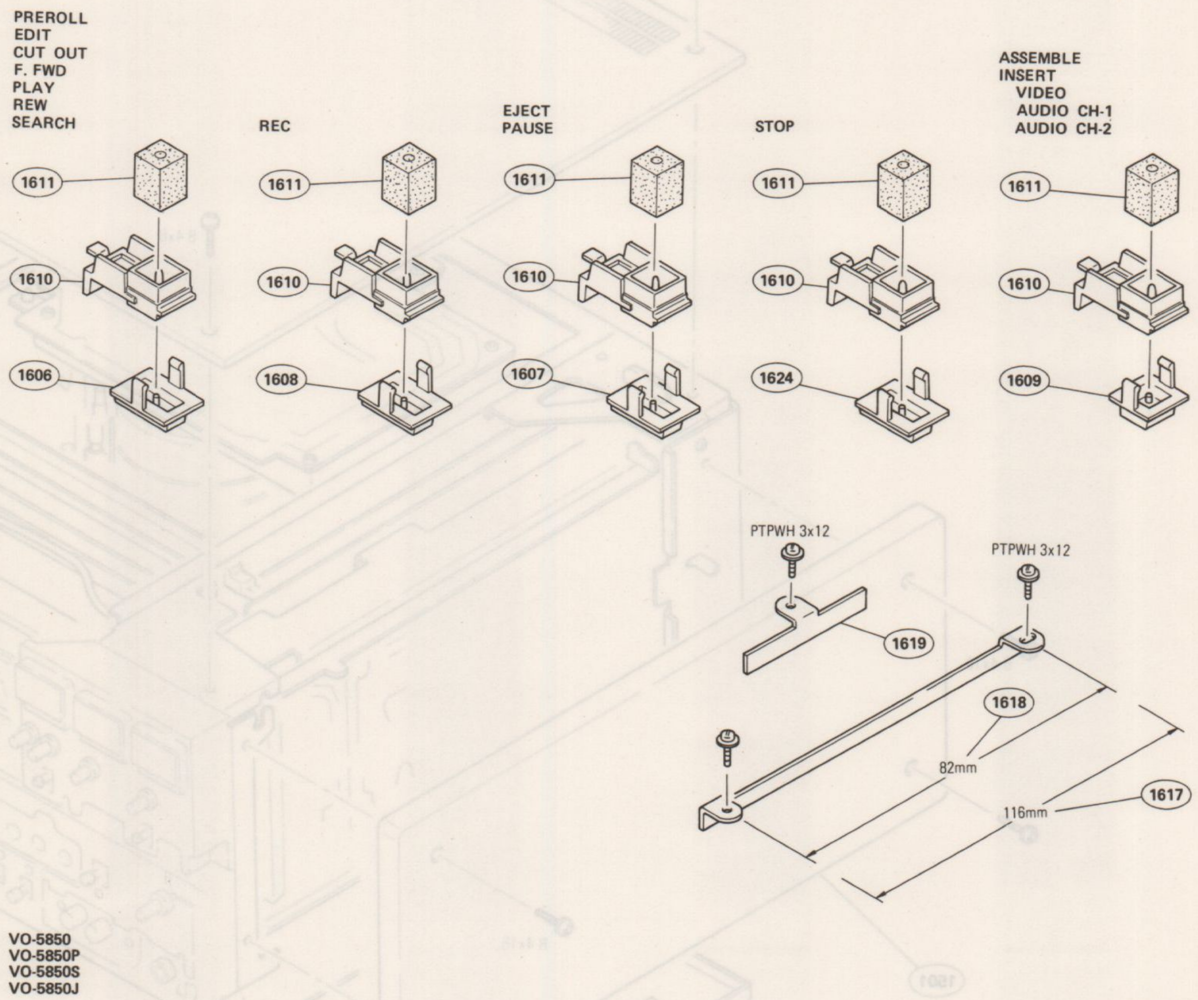
NOTE:

1. **The shaded and ⚠-marked components are critical to safety. Replace only with same components as specified.**
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work.. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

ORNAMENTAL PANEL (2) ORNAMENTAL PANEL (2)

Ornamental Panel (control panel)


1601
1625
1605
1616
1613
1626
PTTWH 3x6
PTTWH 3x6
1612
1628
1603
1604
1620
1614
1602
1616
1613
1616
1627
1614
1621
1623
1622
PSW 3x8
PSW 3x8
PSW 3x8
1602
1615
1615
VO-5850
VO-5850P
VO-5850S
VO-5850J

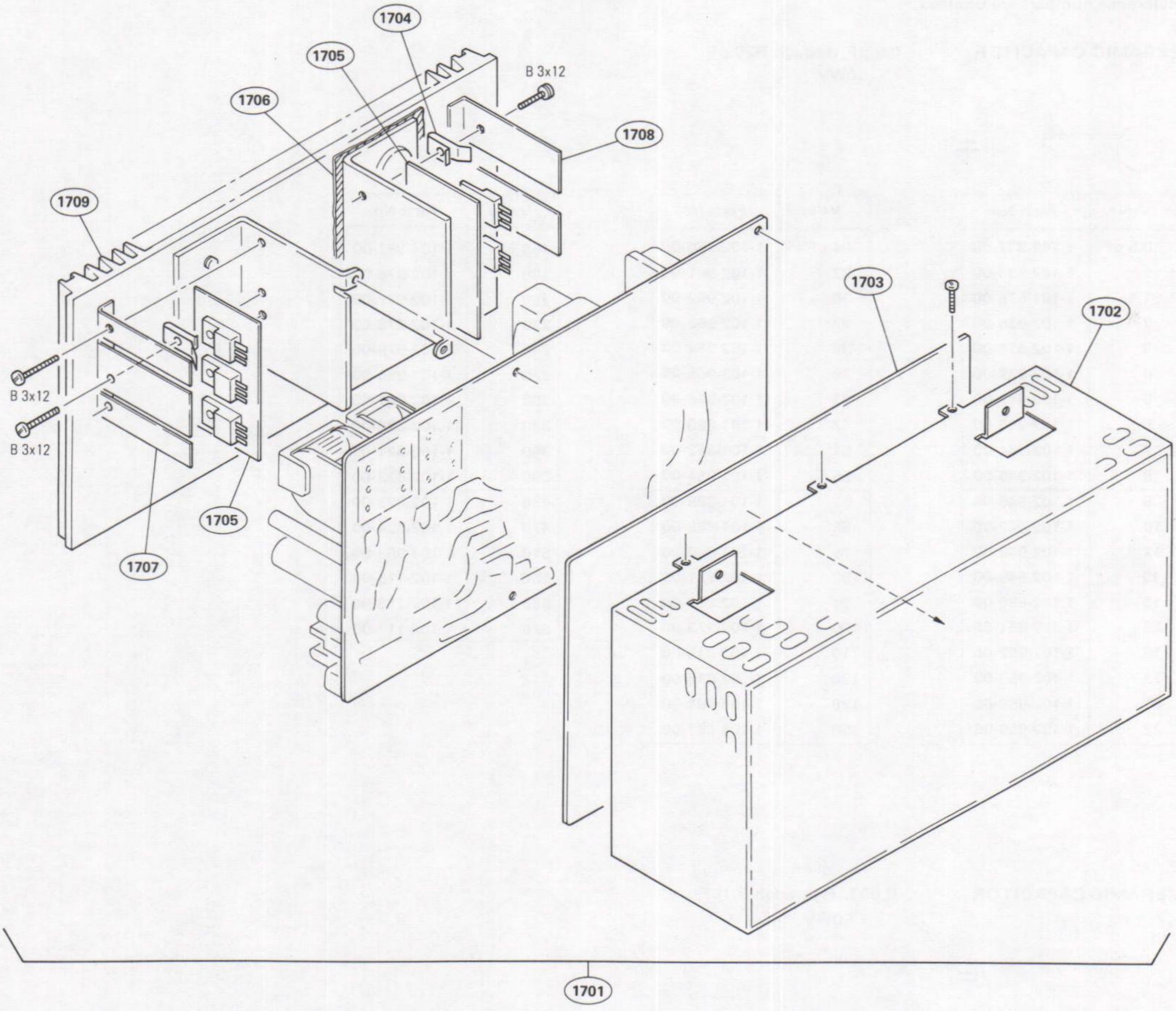

PREROLL
EDIT
CUT OUT
F. FWD
PLAY
REW
SEARCH
REC
EJECT
PAUSE
STOP
ASSEMBLE
INSERT
VIDEO
AUDIO CH-1
AUDIO CH-2
1611
1611
1611
1611
1611
1610
1610
1610
1610
1610
1606
1608
1607
1624
1609
PTPWH 3x12
PTPWH 3x12
1619
1618
82mm
116mm
1617
VO-5850
VO-5850P
VO-5850S
VO-5850J

No.	Parts No.	Description
1601	**A-6704-054-A**	**PANEL (P) (E) BLOCK ASS'Y, FRONT**
1602	**X-3661-073-0**	**KNOB ASS'Y, CONTROL**
1603	**X-3668-075-0**	**KNOB ASS'Y, CONTROL**
1604	**X-3668-755-5**	**PANEL (E) ASS'Y, KEYBOARD**
1605	**2-251-642-00**	**GUARD, POWER SWITCH**
1606	**2-284-722-01**	**KEY TOP (A)**
1607	**2-284-722-11**	**KEY TOP (A)**
1608	**2-284-722-21**	**KEY TOP (A)**
1609	**2-284-723-00**	**KEY TOP (B)**
1610	**2-284-725-00**	**HOLDER, KEY**
1611	2-284-744-00	CUSHION (B), KEY
1612	**3-668-009-02**	**PIN, PUSH BUTTON**
1613	3-668-015-00	PLATE (SMALL), SWITCH, LEVER
1614	3-668-016-00	FRAME (SMALL), ORNAMENTAL
1615	3-668-018-00	FRAME (MIDDLE), ORNAMENTAL
1616	**3-668-028-00**	**KNOB (SMALL), LEVER SWITCH**
1617	3-668-903-00	RETAINER (A), KEY
1618	3-668-904-00	RETAINER (B), KEY
1619	3-668-905-00	RETAINER (C), KEY
1620	**3-668-906-02**	**PUSH BUTTON (3x5)**
1621	**3-668-907-00**	**SPRING**
1622	**3-668-908-00**	**COVER, EN DIAL**
1623	**3-668-909-00**	**DIAL, EN**
1624	**3-668-910-00**	**KEY TOP (STOP)**
1625	**3-668-913-00**	**LABEL, UMATIC**
1626	**3-668-914-00**	**EMBLEM, SONY**
1627	3-669-909-03	PLATE, BLIND, LEVER SWITCH
1628	**4-869-230-00**	**SPRING, COMPRESSION** **(P (AEP) . . . . S/N UP TO 11630** **P (UK) . . . . S/N UP TO 10320)**
	4-858-779-00	**SPRING, COMPRESSION** **(P (AEP) . . . . S/N 11631 AND HIGHER** **P (UK) . . . . S/N 10321 AND HIGHER)**

NOTE:

1. The shaded and ⚠ -marked components are critical to safety.
Replace only with same components as specified.
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

Switching Regulator (UR-02)



No.	Parts No.	Description
⚠ 1701	1-413-075-00	SWITCHING REGULATOR (UR-02)
1702	2-403-440-00	CASE
1703	2-430-684-00	INSULATOR
1704	2-430-683-00	SPRING
1705	2-430-685-00	RUBBER, INSULATING
1706	2-430-686-00	RUBBER, INSULATING
1707	2-430-687-00	RETAINER, SEMICONDUCTOR
1708	2-430-790-00	RETAINER, SEMICONDUCTOR
1709	2-430-689-00	HEAT SINK

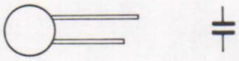
NOTE:

1. **The shaded and ⚠ -marked components are critical to safety. Replace only with same components as specified.**
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

15-3. ELECTRICAL PARTS LIST

Parts that are not listed in the "reference numbers order list" are shown in following table.
Reference numbers are omitted.

CERAMIC CAPACITOR **0.5 pF through 820 pF**
50WV

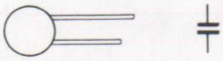


Value	Parts No.
0.5 pF	1-101-837-00
1	1-102-934-00
1.5	1-101-576-00
2	1-102-935-00
3	1-102-936-00
4	1-102-937-00
5	1-102-942-00
6	1-102-943-00
7	1-102-944-00
8	1-102-945-00
9	1-102-946-00
10	1-102-947-00
11	1-102-948-00
12	1-102-949-00
13	1-102-950-00
15	1-102-951-00
16	1-102-952-00
18	1-102-953-00
20	1-102-958-00
22	1-102-959-00

Value	Parts No.
24 pF	1-102-960-00
27	1-102-961-00
30	1-102-962-00
33	1-102-963-00
36	1-102-964-00
39	1-102-965-00
43	1-102-966-00
47	1-101-880-00
51	1-101-882-00
56	1-101-884-00
62	1-101-886-00
68	1-101-888-00
75	1-101-890-00
82	1-102-971-00
91	1-102-972-00
100	1-102-973-00
110	1-102-815-00
120	1-102-816-00
130	1-101-081-00
150	1-101-361-00

Value	Parts No.
160 pF	1-101-367-00
180	1-102-976-00
200	1-102-977-00
220	1-102-978-00
240	1-102-979-00
270	1-102-980-00
300	1-102-981-00
330	1-102-820-00
360	1-102-821-00
390	1-102-822-00
430	1-102-823-00
470	1-102-824-00
510	1-101-059-00
560	1-102-115-00
680	1-102-116-00
820	1-102-117-00

CERAMIC CAPACITOR **0.001μF through 0.1μF**
50WV

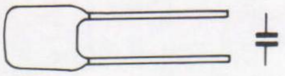


Parts NO. 1-161-□□□-00

Value	Parts No. -□□□-	Substitute
0.001 μF	039	(1-102-074-00)
0.0012	040	
0.0015	041	
0.0018	042	
0.0022	043	(1-102-100-00)
0.0027	044	
0.0033	045	
0.0039	046	(1-102-124-00)
0.0047	047	
0.0056	048	
0.0068	049	
0.0082	050	

Value	Parts No. -□□□-	Substitute
0.01 μF	051	(1-101-118-00)
0.012	052	
0.015	053	
0.018	054	
0.022	055	(1-101-005-00)
0.027	056	
0.033	057	
0.039	058	
0.047	059	(1-101-006-00)
0.056	060	
0.068	061	
0.082	062	
0.1	063	

MYLAR CAPACITOR



0.001μF through 0.22μF
±5% 50WV

Parts No. 1-108-□□□-00

Value	Parts No. —□□□—
0.001μF	555
0.0011	556
0.0012	557
0.0013	558
0.0015	559
0.0016	560
0.0018	561
0.0020	562
0.0022	563
0.0024	564
0.0027	565
0.0030	566
0.0033	567
0.0036	568
0.0039	569

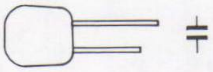
Value	Parts No. —□□□—
0.0043μF	570
0.0047	571
0.0051	572
0.0056	573
0.0062	574
0.0068	575
0.0075	576
0.0082	577
0.0091	578
0.01	579
0.011	580
0.012	581
0.013	582
0.015	583
0.016	584

Value	Parts No. —□□□—
0.018μF	585
0.020	586
0.022	587
0.024	588
0.027	589
0.030	590
0.033	591
0.036	592
0.039	593
0.043	594
0.047	595
0.051	596
0.056	597
0.062	598
0.068	599

Value	Parts No. —□□□—
0.075μF	600
0.082	601
0.091	602
0.1	603
0.11	604
0.12	605
0.13	606
0.15	607
0.16	608
0.18	609
0.20	610
0.22	611

SILVERED MICA CAPACITOR

1 pF through 620 pF
± 5%, 50WV



Parts No. 1-107-□□□-00

Value	Parts No. —□□□—
1 pF	098
2	099
3	100
4	101
5	102
6	103
7	104
8	105
9	106
10	061
11	062
12	063
13	064

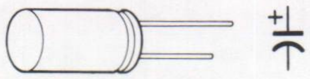
Value	Parts No. —□□□—
15 pF	065
16	066
18	067
20	068
22	069
24	070
27	071
30	072
33	073
36	074
39	075
43	076
47	077

Value	Parts No. —□□□—
51 pF	078
56	079
62	080
68	081
75	082
82	083
91	084
100	085
110	086
120	087
130	088
150	089
160	090

Value	Parts No. —□□□—
180 pF	091
200	092
220	093
240	094
270	095
300	096
330	097
360	231
390	232
430	233
470	234
510	235
560	236
620	237

ELECTROLYTIC CAPACITOR

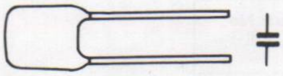
0.47μF through 470μF
6.3WV through 50 (63, 100)WV



Parts No. 1-123-□□□-00

Value		Parts No. —□□□—
0.47μF	50V	
	100	379
1	50	
	100	380
2.2	50	
	100	381
3.3	25	
	35	
	50	
	100	382
4.7	25	
	35	
	50	
	63	369
10	10	
	16	
	25	
	35	
	50	356
22	16	
	25	330
22μF	35V	342
	50	
	63	371
33	6.3	
	10	
	16	318
	25	
	35	343
	50	
	63	372
47	6.3	
	10	306
	16	
	25	332
	35	
	50	359
100	6.3	
	10	307
	16	
	25	333
	35	345
100μF	50V	360
220	6.3	
	10	308
	16	321
	25	334
	35	346
	50	361
330	6.3	
	10	309
	16	322
	25	335
	35	347
	50	362
470	6.3	298
	10	310
	16	323
	25	336
	35	348
	50	
	63	377

MYLAR CAPACITOR

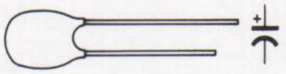


0.00047μF through 0.22μF
±5% 50WV

Parts No. 1-130-□□□-00

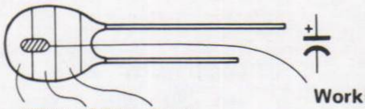
Value	Parts No. —□□□—
0.00047μF	467
0.00056	468
0.00068	469
0.00082	470
0.001	471
0.0012	472
0.0015	473
0.0018	474
0.0022	475
0.0027	476
0.0033	477
0.0039μF	478
0.0047	479
0.0056	480
0.0068	481
0.0082	482
0.01	483
0.012	484
0.015	485
0.018	486
0.022	487
0.027	488
0.033μF	489
0.039	490
0.047	491
0.056	492
0.068	493
0.082	494
0.1	495
0.12	496
0.15	497
0.18	498
0.22	499

TANTALUM CAPACITOR



0.01μF through 100μF ± 10%
3.15V through 35V

NOTE: The value of the parts that are marked by * in the below table are indicated by color code. (to the value with ± 20%)



Ex. BRN GRN BLU
1 5 6

15 x 10^6 pF = 15μF

Working Voltage Color Code

BLK	RED	YEL	GRN	BLU	GRY	WHT
10V	35	6.3	16	20	25	3.15

Parts No. 1-131-□□□-00

Value		Parts No. −□□□−
0.01μ	35V	*396
0.015	35	*397
0.022	35	*398
0.033	35	*399
0.047	35	*400
0.068	35	*401
0.1	35	341
0.15	35	342
0.22	35	343
0.33	25	*409
	35	344
0.47	20	*412
	35	345
0.68	16	*415
	25	*410
	35	346
1.0	10	*418
	25	498

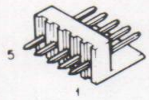
Value		Parts No. −□□□−
1.0μ	35V	347
1.5	6.3	*421
	20	499
	25	354
	35	348
2.2	3.15	*424
	16	500
	20	361
	25	355
	35	349
3.3	10	501
	16	368
	20	362
	25	356
	35	350
4.7	6.3	502
	10	375
	16	369

Value		Parts No. −□□□−
4.7μ	20V	363
	25	357
	35	351
6.8	3.15	503
	6.3	382
	10	376
	16	370
	20	364
	25	358
	35	352
10	3.15	389
	6.3	383
	10	377
	16	371
	20	365
	25	359
	35	353
15	3.15	390
	6.3	384

Value		Parts No. −□□□−
15μ	10V	378
	16	372
	20	366
	25	360
22	3.15	391
	6.3	385
	10	379
	16	373
	20	367
33	3.15	392
	6.3	386
	10	380
	16	374
47	3.15	393
	6.3	387
	10	381
68	3.15	394
	6.3	388
100	3.15	395

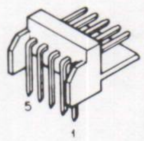
CONNECTOR

top-type receptacle



3P	1-560-008-00
5P	1-560-009-00
6P	1-560-010-00
8P	1-560-011-00
10P	1-560-012-00
12P	1-560-013-00

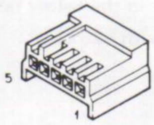
side-type receptacle



3P	1-560-014-00
5P	1-560-015-00
6P	1-560-016-00
8P	1-560-017-00
10P	1-560-018-00
12P	1-560-019-00

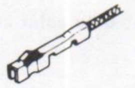
plug

housing



3P	1-561-155-00
5P	1-561-156-00
6P	1-561-157-00
8P	1-561-158-00
10P	1-561-159-00
12P	1-561-160-00

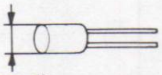
contact



1-560-006-00
(AWG 20 ~ 26)

1-560-007-00
(AWG 26 ~ 30)

MICRO INDUCTOR



1 μH through 470 μH
±5%

Parts No. 1-407-□□□-XX

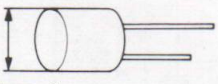
Value	Parts No. —□□□—
1 μH	178
1.2	179
1.5	180
1.8	181
2.2	182
2.7	183
3.3	184
3.9	185

Value	Parts No. —□□□—
4.7 μH	186
5.6	187
6.8	188
8.2	189
10	157
12	158
15	159
18	160

Value	Parts No. —□□□—
22 μH	161
27	162
33	163
39	164
47	165
56	166
68	167
82	168

Value	Parts No. —□□□—
100 μH	169
120	170
150	171
180	172
220	173
270	174
330	175
390	176
470	177

MICRO INDUCTOR



470 μH through 33 mH
±5%

Parts No. 1-407-□□□-00

Value	Parts No. —□□□—
470 μH	488
560	489
680	490
820	491
1 mH	492
1.2	493

Value	Parts No. —□□□—
1.5 mH	494
1.8	495
2.2	496
2.7	497
3.3	498
3.9	499

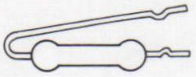
Value	Parts No. —□□□—
4.7 mH	500
5.6	501
6.8	502
8.2	503
10	504
12	505

Value	Parts No. —□□□—
15 mH	506
18	507
22	508
27	509
33	510

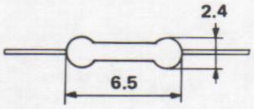
RESISTOR

Parts that are not listed in the "reference numbers order list" are shown in following table.
Reference numbers are omitted.

CARBON RESISTOR (1/4W)



±5%, 1/4W, non-special type
1 Ω through 1 MΩ

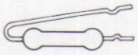


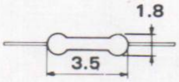
Parts No. 1-246-□□□-00

Value	Parts No. –□□□–	Value	Parts No. –□□□–	Value	Parts No. –□□□–	Value	Parts No. –□□□–
1 Ω	401	33 Ω	437	1 kΩ	473	33 kΩ	509
1.1	402	36	438	1.1	474	36	510
1.2	403	39	439	1.2	475	39	511
1.3	404	43	440	1.3	476	43	512
1.5	405	47	441	1.5	477	47	513
1.6	406	51	442	1.6	478	51	514
1.8	407	56	443	1.8	479	56	515
2	408	62	444	2	480	62	516
2.2	409	68	445	2.2	481	68	517
2.4	410	75	446	2.4	482	75	518
2.7	411	82	447	2.7	483	82	519
3	412	91	448	3.0	484	91	520
3.3	413	100 Ω	449	3.3	485	100 kΩ	521
3.6	414	110	450	3.6	486	110	522
3.9	415	120	451	3.9	487	120	523
4.3	416	130	452	4.3	488	130	524
4.7	417	150	453	4.7	489	150	525
5.1	418	160	454	5.1	490	160	526
5.6	419	180	455	5.6	491	180	527
6.2	420	200	456	6.2	492	200	528
6.8	421	220	457	6.8	493	220	529
7.5	422	240	458	7.5	494	240	530
8.2	423	270	459	8.2	495	270	531
9.1	424	300	460	9.1	496	300	532
10 Ω	425	330	461	10 kΩ	497	330	533
11	426	360	462	11	498	360	534
12	427	390	463	12	499	390	535
13	428	430	464	13	500	430	536
15	429	470	465	15	501	470	537
16	430	510	466	16	502	510	538
18	431	560	467	18	503	560	539
20	432	620	468	20	504	620	540
22	433	680	469	22	505	680	541
24	434	750	470	24	506	750	542
27	435	820	471	27	507	820	543
30	436	910	472	30	508	910	544
						1 MΩ	545

CARBON RESISTOR (1/6W)

±5%, 1/6W, non-special type
2.2Ω through 1MΩ



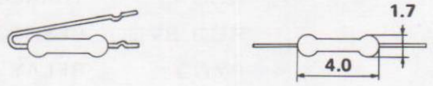


Parts No. 1-247-□□□-00

Value	Parts No. —□□□—	Value	Parts No. —□□□—	Value	Parts No. —□□□—	Value	Parts No. —□□□—
1Ω	–	36Ω	796	1.2kΩ	833	43kΩ	870
1.1	–	39	797	1.3	834	47	871
1.2	–	43	798	1.5	835	51	872
1.3	–	47	799	1.6	836	56	873
1.5	–	51	800	1.8	837	62	874
1.6	–	56	801	2	838	68	875
1.8	–	62	802	2.2	839	75	876
2	–	68	803	2.4	840	82	877
2.2	767	75	804	2.7	841	91	878
2.4	768	82	805	3	842	100kΩ	879
2.7	769	91	806	3.3	843	110	880
3	770	100Ω	807	3.6	844	120	881
3.3	771	110	808	3.9	845	130	882
3.6	772	120	809	4.3	846	150	883
3.9	773	130	810	4.7	847	160	884
4.3	774	150	811	5.1	848	180	885
4.7	775	160	812	5.6	849	200	886
5.1	776	180	813	6.2	850	220	887
5.6	777	200	814	6.8	851	240	888
6.2	778	220	815	7.5	852	270	889
6.8	779	240	816	8.2	853	300	890
7.5	780	270	817	9.1	854	330	891
8.2	781	300	818	10kΩ	855	360	892
9.1	782	330	819	11	856	390	893
10Ω	783	360	820	12	857	430	894
11	784	390	821	13	858	470	895
12	785	430	822	15	859	510	896
13	786	470	823	16	860	560	897
15	787	510	824	18	861	620	898
16	788	560	825	20	862	680	899
18	789	620	826	22	863	750	900
20	790	680	827	24	864	820	901
22	791	750	828	27	865	910	902
24	792	820	829	30	866	1MΩ	903
27	793	910	830	33	867		
30	794	1kΩ	831	36	868		
33	795	1.1	832	39	869		

CARBON RESISTOR (1/8W)

±5%, 1/8W, non-special type
2.2Ω through 1MΩ



Parts No. 1-246-□□□-00

Value	Parts No. —□□□—
1Ω	–
1.1	–
1.2	–
1.3	–
1.5	–
1.6	–
1.8	–
2	–
2.2	751
2.4	812
2.7	752
3	813
3.3	753
3.6	814
3.9	754
4.3	815
4.7	755
5.1	816
5.6	756
6.2	817
6.8	757
7.5	818
8.2	758
9.1	819
10Ω	759
11	820
12	760
13	821
15	761
16	822
18	762
20	823
22	763
24	824
27	764
30	825

Value	Parts No. —□□□—
33Ω	765
36	826
39	766
43	827
47	767
51	828
56	768
62	829
68	769
75	830
82	770
91	831
100Ω	771
110	832
120	772
130	833
150	773
160	834
180	774
200	835
220	775
240	836
270	776
300	837
330	777
360	838
390	778
430	839
470	779
510	840
560	780
620	841
680	781
750	842
820	782
910	843

Value	Parts No. —□□□—
1kΩ	783
1.1	844
1.2	784
1.3	845
1.5	785
1.6	846
1.8	786
2	847
2.2	787
2.4	848
2.7	788
3.0	849
3.3	789
3.6	850
3.9	790
4.3	851
4.7	791
5.1	852
5.6	792
6.2	853
6.8	793
7.5	854
8.2	794
9.1	855
10kΩ	795
11	856
12	796
13	857
15	797
16	858
18	798
20	859
22	799
24	860
27	800
30	861

Value	Parts No. —□□□—
33kΩ	801
36	862
39	802
43	863
47	803
51	864
56	804
62	865
68	805
75	866
82	806
91	867
100kΩ	807
110	868
120	808
130	869
150	809
160	870
180	810
200	871
220	811

Parts No. 1-247-□□□-00

Value	Parts No. —□□□—
240kΩ	054
270	046
300	055
330	047
360	056
390	048
430	057
470	049
510	058
560	050
620	059
680	051
750	060
820	052
910	061
1MΩ	053

ABBREVIATIONS

Ref. No.	Description	Ref. No.	Description	Ref. No.	Description
C□□, CV□□	CAPACITOR	IC□□	IC	Q□□	TRANSISTOR
CF□□	CERAMIC FILTER	J□□	JACK	R□□, RV□□	RESISTOR
CN□□	CONNECTOR	L□□	INDUCTOR	RY□□	RELAY
D□□	DIODE	M□□	MOTOR	S□□, SW□□	SWITCH
DL□□	DELAY LINE	ME□□	METER	SB□□	SOLAR BATTERY
F□□	FUSE	MIC□□	MICROPHONE	T□□	TRANSFORMER
FB□□	FERRITE BEAD	PG□□	PG COIL	TH□□	THERMISTOR
FL□□	FILTER	PL□□	LAMP	X□□	CRYSTAL
H□□	HEAD	PM□□	SOLENOID		

All capacitors are in micro farads unless otherwise specified.

All inductors are in micro henries unless otherwise specified.

All resistors are in ohms.

AC-27 BOARD **(S/N UP TO 17010 (AEP)**
S/N UP TO 11350 (UK))

Ref. No.	Parts No.	Description
	⚠1-603-728-00	PRINTED CIRCUIT BOARD, AC-27
	⚠1-533-037-XX	**HOLDER, FUSE**
⚠C1	**1-130-456-00**	**METALLIZED, 0.022 20% 250V**
⚠CN1	1-506-371-00 1-509-910-00	2P PLUG 2P HOUSING
⚠F1	**1-532-203-00**	**2A, 250V**
⚠T1	**1-421-470-00**	**LINE FILTER**

AC-36 BOARD **(S/N UP TO 17010 (AEP)**
S/N UP TO 11350 (UK))

Ref. No.	Parts No.	Description
	⚠1-605-661-00	PRINTED CIRCUIT BOARD, AC-36
⚠C2	**1-130-539-00**	**METALLIZED POLYESTER 0.1 20% 250V**
⚠C3	**1-130-160-00**	**METALLIZED POLYESTER 0.22 20% 250V**
⚠CN2	1-506-371-00 1-509-910-00	2P PLUG 2P HOUSING
⚠CN3	1-560-136-00 1-561-427-00	4P PLUG 4P HOUSING
⚠T2	**1-421-470-00**	**LINE FILTER**
⚠T3	**1-421-259-00**	**LINE FILTER**

NOTES:

1. **The shaded and ⚠ -marked components are critical to safety.**
Replace only with same components as specified.

2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

AC-35 BOARD (S/N 17011 AND LATER (AEP) S/N 11351 AND LATER (UK))

Ref. No.	Parts No.	Description
	1-606-380-00	PRINTED CIRCUIT BOARD, AC-35
	1-533-037-XX	HOLDER, FUSE
⚠ C1	**1-130-456-00**	**METALLIZED FILM 0.022 20% 250V**
⚠ C2	**1-130-710-00**	**POLYESTER FILM 0.1 20% 250V**
⚠ C3	**1-130-710-00**	**POLYESTER FILM 0.1 20% 250V**
⚠ CN4	1-506-371-00	2P PLUG
⚠	**1-509-910-00**	**2P HOUSING**
⚠	**1-509-898-00**	**RECEPTACLE**
⚠ CN5	1-560-136-00	4P PLUG
⚠	1-561-427-00	4P HOUSING
⚠	1-561-432-00	RECEPTACLE
⚠ F1	**1-532-203-00**	**250V, 2A**
⚠ L1	**1-421-621-00**	**CHOKE COIL**
⚠ L2	**1-421-621-00**	**CHOKE COIL**
⚠ T1	**1-421-470-00**	**LINE FILTER**
⚠ T2	**1-421-470-00**	**LINE FILTER**
⚠ T3	**1-421-259-00**	**LINE FILTER**

AH-3 BOARD

Ref. No.	Parts No.	Description
	1-586-192-00	PRINTED CIRCUIT BOARD, AH-3

AU-21 BOARD

Ref. No.	Parts No.	Description
	⚠ A-6713-109-A	MOUNTED CIRCUIT BOARD, AU-21 S/N UP TO 15230 (AEP) S/N UP TO 11100 (UK)
	⚠ A-6713-109-B	MOUNTED CIRCUIT BOARD, AU-21 S/N 15231 AND LATER (AEP) S/N 11101 AND LATER (UK)

All the diodes that are not listed in this board are 1S1555 (Parts No. 8-719-815-55)

Ref. No.	Parts No.	Description
C10	**1-107-178-00**	**MICA 240PF 5% 500V**
C11	**1-107-178-00**	**MICA 240PF 5% 500V**
C29	**1-107-209-00**	**MICA 20PF 5% 500V**
C101	**1-107-158-00**	**MICA 30PF 5% 500V**
C102	**1-107-158-00**	**MICA 30PF 5% 500V**
C210	**1-107-178-00**	**MICA 240PF 5% 500V**
C211	**1-107-178-00**	**MICA 240PF 5% 500V**
C229	**1-107-209-00**	**MICA 20PF 5% 500V**
CP501	**1-464-139-00**	**BIAS OSC.**
CP502	**1-464-139-00**	**BIAS OSC.**
CV501	**1-141-251-00**	**TRIMMER 150PF x 2**
D5	**8-719-162-07**	**RD6.2E-B**
D7	**8-719-162-07**	**RD6.2E-B**
D12	**8-719-162-07**	**RD6.2E-B**
D18	**8-719-156-07**	**RD5.6E-B**
D20	**8-719-139-07**	**RD3.9E-B**
D205	**8-719-162-07**	**RD6.2E-B**
D207	**8-719-162-07**	**RD6.2E-B**
D212	**8-719-162-07**	**RD6.2E-B**
D219	**8-719-156-07**	**RD5.6E-B**
D501	**8-719-200-02**	**10E-2**
D502	**8-719-200-02**	**10E-2**
D503	**8-719-200-02**	**10E-2**
D504	**8-719-200-02**	**10E-2**
D507	**8-719-200-02**	**10E-2**
D508	**8-719-182-07**	**RD8.2E-B**
D509	**8-719-115-07**	**RD15E-B**
D510	**8-719-182-07**	**RD8.2E-B**

NOTES:

1. **The shaded and ⚠ -marked components are critical to safety.**
Replace only with same components as specified.

2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

Ref. No.	Parts No.	Description
IC1	8-759-115-83	μPC1158H2 (NEC)
IC2	8-759-115-83	μPC1158H2 (NEC)
IC3	8-759-705-58	NJM4558D-D (RC4558; RAYTHEON)
IC4	8-759-705-58	NJM4558D-D (RC4558; RAYTHEON)
IC5	8-759-240-16	TC4016BP, C-MOS (CD4016AE/BE; RCA)
IC201	8-759-115-83	μPC1158H2 (NEC)
IC202	8-759-115-83	μPC1158H2 (NEC)
IC203	8-759-705-58	NJM4558D-D (RC4558; RAYTHEON)
IC204	8-759-705-58	NJM4558D-D (RC4558; RAYTHEON)
IC501	8-759-240-16	TC4016BP, C-MOS (CD4016AE/BE; RCA)
IC901	8-720-002-96	TX-429D
IC902	8-720-002-96	TX-429D
IC903	8-720-002-96	TX-429D
IC904	8-720-002-96	TX-429D
L2	1-407-519-00	8
L202	1-407-519-00	8
LV1	1-407-576-00	VAR 220
LV2	1-409-295-00	VAR 22
LV3	1-409-295-00	VAR 22
LV201	1-407-576-00	VAR 220
LV202	1-409-295-00	VAR 22
LV203	1-409-295-00	VAR 22
LV501	1-407-284-00	VAR 1mH
LV502	1-407-284-00	VAR 1mH
LV503	1-407-284-00	VAR 1mH
Q1	8-761-622-00	2SC1636
Q2	8-729-612-77	2SA1027R
Q3	8-761-622-00	2SC1636
Q4	8-729-663-47	2SC1364
Q6	8-729-663-47	2SC1364

Ref. No.	Parts No.	Description
Q7	8-729-663-47	2SC1364
Q8	8-729-663-47	2SC1364
Q9	8-729-663-47	2SC1364
Q10	8-729-663-47	2SC1364
Q11	8-729-612-77	2SA1027R
Q12	8-729-612-77	2SA1027R
Q13	8-729-663-47	2SC1364
Q14	8-729-663-47	2SC1364
Q15	8-729-663-47	2SC1364
Q16	8-729-663-47	2SC1364
Q17	8-729-663-47	2SC1364
Q18	8-729-177-32	2SD773
Q19	8-729-663-47	2SC1364
Q201	8-761-622-00	2SC1636
Q202	8-729-612-77	2SA1027R
Q203	8-761-622-00	2SC1636
Q204	8-729-663-47	2SC1364
Q205	8-729-663-47	2SC1364
Q206	8-729-663-47	2SC1364
Q207	8-729-663-47	2SC1364
Q208	8-729-663-47	2SC1364
Q209	8-729-663-47	2SC1364
Q210	8-729-663-47	2SC1364
Q211	8-729-612-77	2SA1027R
Q212	8-729-612-77	2SA1027R
Q213	8-729-663-47	2SC1364
Q214	8-729-663-47	2SC1364
Q215	8-729-663-47	2SC1364
Q216	8-723-302-00	2SK43-2
Q217	8-761-622-00	2SC1636
Q218	8-729-177-32	2SD773
Q219	8-729-663-47	2SC1364
Q220	8-729-663-47	2SC1364
Q501	8-729-663-47	2SC1364
Q502	8-729-663-47	2SC1364
Q503	8-729-663-47	2SC1364
Q504	8-729-663-47	2SC1364
Q505	8-729-663-47	2SC1364
Q506	8-729-612-77	2SA1027R
Q507	8-729-663-47	2SC1364
Q508	8-729-663-47	2SC1364
Q509	8-729-331-53	2SC2315
Q510	8-729-374-02	2SB740
Q511	8-729-663-47	2SC1364

NOTES:

1. **The shaded and ⚠ -marked components are critical to safety. Replace only with same components as specified.**
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

Ref. No.	Parts No.	Description
Q512	**8-729-612-77**	**2SA1027R**
Q513	**8-729-663-47**	**2SC1364**
R6	**1-244-867-00**	**CARBON 560 5% 1/2W**
R57	**1-214-750-00**	**METAL 7.5K 1% 1/4W**
R58	**1-214-777-00**	**METAL 100K 1% 1/4W**
R59	**1-214-754-00**	**METAL 11K 1% 1/4W**
R60	**1-214-726-00**	**METAL 750 1% 1/4W**
R206	**1-244-867-00**	**CARBON 560 5% 1/2W**
R257	**1-214-750-00**	**METAL 7.5K 1% 1/4W**
R258	**1-214-777-00**	**METAL 100K 1% 1/4W**
R259	**1-214-754-00**	**METAL 11K 1% 1/4W**
R260	**1-214-726-00**	**METAL 750 1% 1/4W**
⚠ **R516**	**1-207-636-00**	**WIREWOUND 100 10% 3W**
⚠ **R517**	**1-207-636-00**	**WIREWOUND 100 10% 3W**
RV1	**1-224-253-XX**	**VAR, METAL 22K (B)**
RV2	**1-224-251-XX**	**VAR, METAL 4.7K (B)**
RV3	**1-224-254-XX**	**VAR, METAL 47K (B)**
RV4	**1-224-248-XX**	**VAR, METAL 470 (B)**
RV5	**1-224-253-XX**	**VAR, METAL 22K (B)**
RV6	**1-224-254-XX**	**VAR, METAL 47K (B)**
RV201	**1-224-253-XX**	**VAR, METAL 22K (B)**
RV202	**1-224-251-XX**	**VAR, METAL 4.7K (B)**
RV203	**1-224-254-XX**	**VAR, METAL 47K (B)**
RV204	**1-224-248-XX**	**VAR, METAL 470 (B)**
RV205	**1-224-253-XX**	**VAR, METAL 22K (B)**
RV206	**1-224-254-XX**	**VAR, METAL 47K (B)**
RY501	**1-515-476-00**	**12V, 280 OHM**
RY502	**1-515-475-00**	**12V, 280 OHM**
T1	**1-427-284-00**	**OUTPUT**
T201	**1-427-284-00**	**OUTPUT**

Ref. No.	Parts No.	Description
BS-3 BOARD		
	A-6725-231-A	MOUNTED CIRCUIT BOARD, BS-3
	All the diodes that are not listed in this board are 1S1555 (Parts No. 8-719-815-55)	
***C12**	**1-102-114-00**	**CERAMIC 470PF 10% 50V**
***D1**	**8-719-911-19**	**1SS119**
***D2**	**8-719-911-19**	**1SS119**
***D3**	**8-719-911-19**	**1SS119**
IC1	**8-759-240-11**	**TC4011BP, C-MOS (CD4011AE/BE; RCA)**
IC2	**8-759-240-13**	**TC4013BP, C-MOS (CD4013AE/BE; RCA)**
IC3	**8-759-240-13**	**TC4013BP, C-MOS (CD4013AE/BE; RCA)**
IC4	**8-759-904-69**	**MSM4069, C-MOS (CD4069UBE; RCA)**
IC5	**8-759-240-15**	**TC4015BP, C-MOS (CD4015AE/BE; RCA)**
IC6	**8-759-345-38**	**HD14538BP, C-MOS (MC14538BCP; MOTOROLA)**
***IC4**	**8-759-045-84**	**MC14584BCP, C-MOS**
***IC7**	**8-759-240-81**	**TC4081BP, C-MOS (CD4081BE; RCA)**
***IC8**	**8-759-240-30**	**TC4030BP, C-MOS (CD4030BE; RCA)**
Q1	**8-729-663-47**	**2SC1364**
Q2	**8-729-663-47**	**2SC1364**

*** S/N 11631 AND LATER (AEP)**
S/N 10321 AND LATER (UK)

NOTES:

1. **The shaded and ⚠ -marked components are critical to safety.**
   Replace only with same components as specified.

2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

Ref. No.	Parts No.	Description
CC-9 BOARD		
	1-604-429-00	PRINTED CIRCUIT BOARD, CC-9
CC-10 BOARD		
	1-604-430-00	PRINTED CIRCUIT BOARD, CC CC-10
IC1	**8-719-104-42**	**PS4005 (NEC)**
CC-11 BOARD		
	1-604-431-00	PRINTED CIRCUIT BOARD, CC-11
IC1	**8-719-104-42**	**PS4005 (NEC)**

CF-7 BOARD (**S/N UP TO 14430 (AEP)**
S/N UP TO 10920 (UK))

Ref. No.	Parts No.	Description
	A-6715-123-A	MOUNTED CIRCUIT BOARD, CF-7
C7	**1-131-341-00**	**TANTALUM 0.1 10% 35V**
C11	**1-131-361-00**	**TANTALUM 2.2 10% 20V**
C16	**1-131-341-00**	**TANTALUM 0.1 10% 35V**
C18	**1-131-341-00**	**TANTALUM 0.1 10% 35V**
C24	**1-131-341-00**	**TANTALUM 0.1 10% 35V**
C28	**1-131-361-00**	**TANTALUM 2.2 10% 20V**
C38	**1-131-341-00**	**TANTALUM 0.1 10% 35V**
C39	**1-131-341-00**	**TANTALUM 0.1 10% 35V**
C45	**1-109-159-00**	**MICA 360PF 5% 300V**
C50	**1-131-368-00**	**TANTALUM 3.3 10% 16V**
C51	**1-131-368-00**	**TANTALUM 3.3 10% 16V**
C52	**1-131-368-00**	**TANTALUM 3.3 10% 16V**
C53	**1-109-716-00**	**MICA 100PF 5% 300V**
C65	**1-109-716-00**	**MICA 100PF 5% 300V**
IC1	**8-759-240-30**	**TC4030BP, C-MOS (CD4030AE/BE; RCA)**
IC2	**8-759-240-81**	**TC4081BP, C-MOS (CD4081BE; RCA)**
IC3	**8-759-240-13**	**TC4013BP, C-MOS (CD4013AE/BE; RCA)**
IC4	**8-759-240-13**	**TC4013BP, C-MOS (CD4013AE/BE; RCA)**
IC5	**8-759-345-38**	**HD14538BP, C-MOS (MC14538BCP; MOTOROLA)**
IC6	**8-759-990-82**	**TL082CP (TI)**
IC7	**8-759-345-38**	**HD14538BP, C-MOS (MC14538BCP; MOTOROLA)**
IC8	**8-759-240-13**	**TC4013BP, C-MOS (CD4013AE/BE; RCA)**
IC9	**8-759-240-13**	**TC4013BP, C-MOS (CD4013AE/BE; RCA)**
IC10	**8-759-240-13**	**TC4013BP, C-MOS (CD4013AE/BE; RCA)**

NOTES:

1. **The shaded and ⚠ -marked components are critical to safety.**
   Replace only with same components as specified.

2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

Ref. No.	Parts No.	Description
IC11	**8-759-345-38**	**HD14538BP, C-MOS (MC14538BCP; MOTOROLA)**
IC12	**8-759-240-81**	**TC4081BP, C-MOS (CD4081BE; RCA)**
IC13	**8-759-990-82**	**TL082CP (TI)**
IC14	**8-759-240-15**	**TC4015BP, C-MOS (CD4015AE/BE; RCA)**
IC15	**8-759-240-73**	**TC4073BP, C-MOS (CD4073BE; RCA)**
IC16	**8-759-240-13**	**TC4013BP, C-MOS (CD4013AE/BE; RCA)**
IC17	**8-759-240-13**	**TC4013BP, C-MOS (CD4013AE/BE; RCA)**
IC18	**8-759-240-69**	**TC4069UBP, C-MOS (CD4069UBE; RCA)**
IC19	**8-759-345-38**	**HD14538BP, C-MOS (MC14538BCP; MOTOROLA)**
IC20	**8-759-240-81**	**TC4081BP, C-MOS (CD4081BE; RCA)**
IC21	**8-759-240-81**	**TC4081BP, C-MOS (CD4081BE; RCA)**
IC22	**8-759-240-13**	**TC4013BP, C-MOS (CD4013AE/BE; RCA)**
IC23	**8-759-240-13**	**TC4013BP, C-MOS (CD4013AE/BE; RCA)**
IC24	**8-759-240-01**	**TC4001BP, C-MOS (CD4001AE/BE; RCA)**
IC25	**8-759-045-84**	**MC14584BCP, C-MOS (MOTOROLA)**
IC26	**8-759-902-21**	**SN74LS221N, (TI)**
IC27	**8-759-240-71**	**TC4071BP, C-MOS (CD4071BE; RCA)**
IC28	**8-759-240-01**	**TC4001BP, C-MOS (CD4001AE/BE; RCA)**
IC29	**8-759-240-11**	**TC4011BP, C-MOS (CD4011AE/BE; RCA)**
IC30	**8-759-240-71**	**TC4071BP, C-MOS (CD4071BE; RCA)**
IC31	**8-759-240-15**	**TC4015BP, C-MOS (CD4015AE/BE; RCA)**
IC32	**8-759-345-38**	**HD14538BP, C-MOS (MC14538BCP; MOTOROLA)**
Q1	**8-729-663-47**	**2SC1364**
Q2	**8-729-663-47**	**2SC1364**
Q3	**8-729-663-47**	**2SC1364**
Q4	**8-729-663-47**	**2SC1364**
Q5	**8-729-663-47**	**2SC1364**

Ref. No.	Parts No.	Description
Q6	**8-729-663-47**	**2SC1364**
Q7	**8-729-663-47**	**2SC1364**
Q8	**8-729-663-47**	**2SC1364**
Q9	**8-729-384-47**	**2SA844**
Q10	**8-729-663-47**	**2SC1364**
Q11	**8-729-663-47**	**2SC1364**
Q12	**8-729-663-47**	**2SC1364**
Q13	**8-729-663-47**	**2SC1364**
Q14	**8-729-663-47**	**2SC1364**
RV1	**1-224-256-XX**	**VAR, METAL 220K (B)**
RV2	**1-224-256-XX**	**VAR, METAL 220K (B)**

CF-10 BOARD (**S/N 14431 AND LATER (AEP)**
S/N 10921 AND LATER (UK))

Ref. No.	Parts No.	Description
	A-6715-180-A	MOUNTED CIRCUIT BOARD, CF-10
C7	**1-131-368-00**	**TANTALUM 3.3 10% 16V**
D1	**8-719-911-19**	**1SS119**
D2	**8-719-911-19**	**1SS119**
D3	**8-719-911-19**	**1SS119**
D4	**8-719-911-19**	**1SS119**
D5	**8-719-911-19**	**1SS119**
D6	**8-719-911-19**	**1SS119**
IC1	**8-759-990-82**	**TL082CP (TI)**
IC2	**8-759-990-82**	**TL082CP (TI)**
IC3	**8-759-240-69**	**TC4069UBP (CD4069UBE; RCA)**
IC4	**8-759-240-81**	**TC4081BP (CD4081BE; RCA)**
IC5	**8-759-240-69**	**TC4069UBP (CD4069UBE; RCA)**
IC6	**8-757-928-00**	**CX-7928 (SONY)**
IC7	**8-759-345-38**	**HD14538BP (MC14538BCP; MOTOROLA)**

NOTES:

1. **The shaded and ⚠ -marked components are critical to safety.**
Replace only with same components as specified.

2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

Ref. No.	Parts No.	Description
Q1	**8-729-663-47**	**2SC1364**
Q2	**8-729-663-47**	**2SC1364**
Q3	**8-729-663-47**	**2SC1364**
Q4	**8-729-663-47**	**2SC1364**
Q5	**8-729-663-47**	**2SC1364**
Q6	**8-729-663-47**	**2SC1364**
Q7	**8-729-663-47**	**2SC1364**
Q8	**8-729-663-47**	**2SC1364**
Q9	**8-724-375-01**	**2SC403C**
Q10	**8-729-663-47**	**2SC1364**
Q11	**8-729-612-77**	**2SA1027R**
Q12	**8-729-663-47**	**2SC1364**
Q13	**8-729-663-47**	**2SC1364**
X1	**1-527-345-00**	**CRYSTAL, 4.433619MHz**

DC-10A BOARD

Ref. No.	Parts No.	Description
	⚠ A-6723-168-A	MOUNTED CIRCUIT BOARD, DC-10A
	1-533-037-XX	**HOLDER, FUSE**
D31	**8-719-200-02**	**10E-2**
D32	**8-719-200-02**	**10E-2**
D33	**8-719-200-02**	**10E-2**
D34	**8-719-200-02**	**10E-2**
D51	**8-719-911-55**	**U05G**
⚠ **F1**	**1-532-237-00**	**3.15A, 250V**
IC1	**8-759-145-58**	**μPC4558C C-MOS (RC4558; RAYTHEON)**
Q1	**8-729-663-47**	**2SC1364**
Q31	**8-729-177-32**	**2SD773**
Q32	**8-729-177-32**	**2SD773**
Q51	**8-729-663-47**	**2SC1364**
Q52	**8-729-315-63**	**2SB856**
Q54	**8-729-612-77**	**2SA1027R**
Q55	**8-729-177-32**	**2SD773**
R1	**1-214-144-00**	**METAL 3.3K 1% 1/4W**
R2	**1-214-143-00**	**METAL 3K 1% 1/4W**
⚠ **R31**	**1-207-636-11**	**WIREWOUND 100 10% 2W**
R32	**1-207-636-11**	**WIREWOUND 100 10% 2W**
R33	**1-202-850-00**	**SOLID 2.2 1/4W**
R34	**1-202-850-00**	**SOLID 2.2 1/4W**
R35	**1-202-850-00**	**SOLID 2.2 1/4W**
R36	**1-202-850-00**	**SOLID 2.2 1/4W**
R51	**1-207-621-00**	**WIREWOUND 1.5 10% 2W**

DM-22A BOARD with CL-4, DL-2 BOARD

Ref. No.	Parts No.	Description
	⚠ A-6711-288-A	MOUNTED CIRCUIT BOARD, DM-22A WITH CL-4, DL-2

All the diodes that are not listed in this board are 1S1555 (Parts No. 8-719-815-55)

CL-4 BOARD

Ref. No.	Parts No.	Description
	1-604-058-00	PRINTED CIRCUIT BOARD, CL-4
S1	**1-514-633-00**	**SLIDE "COLOR LOCK"**

DL-2 BOARD

Ref. No.	Parts No.	Description
	1-602-808-00	PRINTED CIRCUIT BOARD, DL-2
	1-560-035-00	5P PIN
DL7	**1-415-236-31**	**1H**

NOTES:

1. **The shaded and ⚠ -marked components are critical to safety.**
Replace only with same components as specified.
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

Ref. No.	Parts No.	Description
DM-22A BOARD		
C24	**1-109-690-00**	**MICA 510PF 1% 500V**
C25	**1-107-208-00**	**MICA 18PF 5% 500V**
C57	**1-107-202-00**	**MICA 10PF 5% 500V**
C58	**1-107-042-00**	**MICA 2.2PF 0.5PF 500V**
C64	**1-107-211-00**	**MICA 24PF 5% 500V**
C84	**1-107-206-00**	**MICA 15PF 5% 500V**
C120	**1-107-205-00**	**MICA 13PF 5% 500V**
C122	**1-107-208-00**	**MICA 18PF 5% 500V**
C130	**1-107-210-00**	**MICA 22PF 5% 500V**
C148	**1-107-048-00**	**MICA 6.8PF 0.5PF 500V**
C155	**1-123-311-00**	**ELECT 1000 20% 10V**
C156	**1-123-311-00**	**ELECT 1000 20% 10V**
C157	**1-123-311-00**	**ELECT 1000 20% 10V**
C159	**1-102-759-00**	**CERAMIC 62PF 5% 50V**
C401	**1-107-042-00**	**MICA 2.2PF 0.5PF 500V**
C405	**1-107-205-00**	**MICA 13PF 5% 500V**
C406	**1-107-207-00**	**MICA 16PF 5% 500V**
C427	**1-107-204-00**	**MICA 12PF 5% 500V**
C428	**1-107-209-00**	**MICA 20PF 5% 500V**
C505	**1-107-026-00**	**MICA 5.1PF 0.5PF 500V**
C601	**1-107-049-00**	**MICA 8.2PF 0.5PF 500V**
D5	**8-719-709-25**	**1S1925-P**
DL1	**1-415-153-00**	**0.2μS**
DL2	**1-415-096-00**	**0.3μS**
DL4	**1-415-231-00**	**0.3μS**
FL1	**1-231-296-00**	**BPF**
FL2	**1-231-579-00**	**LPF**
FL3	**1-235-002-00**	**LPF**
FL4	**1-235-044-00**	**LPF**
IC1	**8-759-245-28**	**TC4528BP, C-MOS (MC14528BCP; MOTOROLA)**
IC2	**8-759-245-28**	**TC4528BP, C-MOS (MC14528BCP; MOTOROLA)**
IC4	**8-751-350-00**	**CX-135 (SONY)**
IC5	**8-759-908-59**	**CX-859 (SONY)**
IC6	**8-751-300-00**	**CX-130 (SONY)**

Ref. No.	Parts No.	Description
IC7	**8-750-000-46**	**CX-872 (SONY)**
IC11	**8-759-270-60**	**TA7060P (TOSHIBA)**
IC12	**8-749-938-90**	**BX-389 (SONY)**
IC14	**8-751-300-00**	**CX-130 (SONY)**
IC15	**8-759-969-13**	**SN16913P (TI)**
IC18	**8-759-969-13**	**SN16913P (TI)**
IC19	**8-749-938-90**	**BX-389 (SONY)**
IC20	**8-749-938-90**	**BX-389 (SONY)**
IC21	**8-749-938-80**	**BX-388 (SONY)**
IC22	**8-751-300-00**	**CX-130 (SONY)**
IC23	**8-759-969-13**	**SN16913P (TI)**
IC26	**8-759-270-60**	**TA7060P (TOSHIBA)**
LV37	**1-407-570-00**	**VAR 15**
LV42	**1-407-566-00**	**VAR 3.3**
Q1	**8-724-375-01**	**2SC403C**
Q2	**8-729-612-77**	**2SA1027R**
Q3	**8-724-375-01**	**2SC403C**
Q4	**8-724-375-01**	**2SC403C**
Q5	**8-761-622-00**	**2SC1636**
Q6	**8-761-622-00**	**2SC1636**
Q7	**8-724-375-01**	**2SC403C**
Q8	**8-724-375-01**	**2SC403C**
Q9	**8-724-375-01**	**2SC403C**
Q11	**8-729-612-77**	**2SA1027R**
Q12	**8-729-663-47**	**2SC1364**
Q13	**8-729-663-47**	**2SC1364**
Q15	**8-724-375-01**	**2SC403C**
Q16	**8-729-612-77**	**2SA1027R**
Q17	**8-761-622-00**	**2SC1636**
Q18	**8-724-375-01**	**2SC403C**
Q19	**8-729-663-47**	**2SC1364**
Q20	**8-729-663-47**	**2SC1364**
Q21	**8-761-622-00**	**2SC1636**
Q22	**8-761-622-00**	**2SC1636**
Q23	**8-761-622-00**	**2SC1636**
Q25	**8-724-375-01**	**2SC403C**
Q26	**8-761-622-00**	**2SC1636**
Q29	**8-729-663-47**	**2SC1364**
Q32	**8-724-375-01**	**2SC403C**

NOTES:

1. **The shaded and ⚠ -marked components are critical to safety. Replace only with same components as specified.**

2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

Ref. No.	Parts No.	Description
Q33	**8-724-375-01**	**2SC403C**
Q36	**8-724-375-01**	**2SC403C**
Q37	**8-761-622-00**	**2SC1636**
Q38	**8-761-622-00**	**2SC1636**
Q39	**8-724-375-01**	**2SC403C**
Q401	**8-724-375-01**	**2SC403C**
Q402	**8-724-375-01**	**2SC403C**
Q403	**8-724-375-01**	**2SC403C**
Q404	**8-729-663-47**	**2SC1364**
Q405	**8-729-612-77**	**2SA1027R**
Q406	**8-761-622-00**	**2SC1636**
Q407	**8-724-375-01**	**2SC403C**
Q501	**8-729-663-47**	**2SC1364**
Q601	**8-724-375-01**	**2SC403C**
Q602	**8-729-612-77**	**2SA1027R**
Q603	**8-761-622-00**	**2SC1636**
Q604	**8-729-663-47**	**2SC1364**
Q605	**8-761-622-00**	**2SC1636**
Q950	**8-724-375-01**	**2SC403C**
Q951	**8-761-622-00**	**2SC1636**
Q960	**8-729-612-77**	**2SA1027R**
R32	**1-214-130-00**	**METAL 820 1% 1/4W**
R34	**1-214-119-00**	**METAL 300 1% 1/4W**
⚠ **R83**	**1-207-636-00**	**WIREWOUND 100 10% 3W**
R121	**1-244-847-00**	**CARBON 82 5% 1/2W**
R410	**1-244-851-00**	**CARBON 120 5% 1/2W**
⚠ **R619**	**1-207-636-00**	**WIREWOUND 100 10% 3W**
RV1	**1-224-660-21**	**VAR, METAL 1K (B)**
RV2	**1-224-253-XX**	**VAR, METAL 22K (B)**
RV3	**1-224-253-XX**	**VAR, METAL 22K (B)**
RV4	**1-224-253-XX**	**VAR, METAL 22K (B)**
RV5	**1-224-253-XX**	**VAR, METAL 22K (B)**
RV6	**1-224-250-XX**	**VAR, METAL 2.2K (B)**
RV7	**1-224-249-XX**	**VAR, METAL 1K (B)**
RV8	**1-224-134-XX**	**VAR, METAL 470K (B)**
RV9	**1-224-251-XX**	**VAR, METAL 4.7K (B)**
RV10	**1-224-251-XX**	**VAR, METAL 4.7K (B)**

Ref. No.	Parts No.	Description
RV12	**1-224-253-XX**	**VAR, METAL 22K (B)**
RV15	**1-224-550-21**	**VAR, METAL 220 (B)**
RV17	**1-224-252-XX**	**VAR, METAL 10K (B)**
RV19	**1-224-248-XX**	**VAR, METAL 470 (B)**
RV21	**1-224-250-XX**	**VAR, METAL 2.2K (B)**
RV22	**1-224-550-21**	**VAR, METAL 220 (B)**
RV61	**1-224-255-XX**	**VAR, METAL 100K (B)**
RV71	**1-224-134-XX**	**VAR, METAL 470K (B)**
RV401	**1-224-250-XX**	**VAR, METAL 2.2K (B)**
RV402	**1-224-250-XX**	**VAR, METAL 2.2K (B)**
S1	**1-552-101-00**	**SLIDE "NOISE CANCEL"**
T1	**1-425-982-00**	**BPT**
T2	**1-425-880-21**	**BURST AMP.**
T3	**1-411-106-00**	**TUNING**
X1	**1-527-231-00**	**OSC. 4.433618 MHz**
X2	**1-527-829-00**	**OSC. 9.3005 MHz**

NOTES:

1. **The shaded and ⚠ -marked components are critical to safety.**
   Replace only with same components as specified.

2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

Ref. No.	Parts No.	Description
EC-19 BOARD		
	1-603-729-00	PRINTED CIRCUIT BOARD, EC-19
FR-11 BOARD		
	1-603-585-00	PRINTED CIRCUIT BOARD, FR-11
IC1	**8-719-104-42**	**PS4005 (NEC)**
IC2	**8-719-104-42**	**PS4005 (NEC)**

Ref. No.	Parts No.	Description
HP-3 BOARD		
	1-603-734-00	PRINTED CIRCUIT BOARD, HP-3
KY-13A BOARD with DP-10 BOARD		
	A-6728-271-A	MOUNTED CIRCUIT BOARD, KY-13A WITH DP-10
DP-10 BOARD		
	1-603-733-00	PRINTED CIRCUIT BOARD, DP-10
D1	**8-719-912-22**	**SL1222**
D2	**8-719-912-22**	**SL1222**
D3	**8-719-951-02**	**LD001UR-JK**

NOTES:

1. **The shaded and ⚠ -marked components are critical to safety.**
   Replace only with same components as specified.

2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

Ref. No.	Parts No.	Description
KY-13A BOARD		
C3	1-102-110-00	CERAMIC 220PF 10% 50V
C4	1-102-110-00	CERAMIC 220PF 10% 50V
C5	1-102-110-00	CERAMIC 220PF 10% 50V
C6	1-102-110-00	CERAMIC 220PF 10% 50V
C7	1-102-110-00	CERAMIC 220PF 10% 50V
C8	1-102-121-00	CERAMIC 0.0022 10% 50V
C9	1-102-121-00	CERAMIC 0.0022 10% 50V
C10	1-102-121-00	CERAMIC 0.0022 10% 50V
C11	1-102-121-00	CERAMIC 0.0022 10% 50V
C12	1-102-121-00	CERAMIC 0.0022 10% 50V
C13	1-102-121-00	CERAMIC 0.0022 10% 50V
C14	1-102-121-00	CERAMIC 0.0022 10% 50V
C15	1-102-121-00	CERAMIC 0.0022 10% 50V
CN11	1-508-857-00	15P CONNECTOR, PIN
CN12	1-555-743-00	40P FLAT CABLE
D1	8-719-911-19	1SS119
D5	8-719-911-19	1SS119
D6	8-719-911-19	1SS119
D7	8-719-904-55	LED, GL-5HD5
D8	8-719-911-19	1SS119
D9	8-719-911-19	1SS119
D11	8-719-911-19	1SS119
D12	8-719-911-19	1SS119
D13	8-719-904-55	LED, GL-5HD5
D14	8-719-911-19	1SS119
D15	8-719-904-55	LED, GL-5HD5
D16	8-719-911-19	1SS119
D17	8-719-911-19	1SS119
D18	8-719-904-55	LED, GL-5HD5
D19	8-719-904-55	LED, GL-5HD5
D20	8-719-911-19	1SS119
D21	8-719-904-55	LED, GL-5HD5
D22	8-719-904-55	LED, GL-5HD5
D23	8-719-911-19	1SS119
D24	8-719-911-19	1SS119

Ref. No.	Parts No.	Description
D25	8-719-911-19	1SS119
D26	8-719-911-19	1SS119
D27	8-719-904-55	LED, GL-5HD5
D28	8-719-911-19	1SS119
D29	8-719-911-19	1SS119
D30	8-719-904-55	LED, GL-5HD5
D31	8-719-911-19	1SS119
D32	8-719-911-19	1SS119
D33	8-719-904-55	LED, GL-5HD5
D34	8-719-904-55	LED, GL-5HD5
IC1	8-759-645-16	M54516P (MITSUBISHI)
IC2	8-759-245-43	TC4543BP, C-MOS (MC14543BCP; MOTOROLA)
IC3	8-759-240-42	TC4042BP, C-MOS (CD4042AE/BE; RCA)
IC4	8-759-345-03	HD14503BP, C-MOS (MC14503BCP; MOTOROLA)
PL1	1-518-262-00	PILOT 5V, 60mA
PL2	1-518-262-00	PILOT 5V, 60mA
PL3	1-518-262-00	PILOT 5V, 60mA
PL4	1-518-262-00	PILOT 5V, 60mA
PL5	1-518-262-00	PILOT 5V, 60mA
PL6	1-518-262-00	PILOT 5V, 60mA
Q1	8-729-612-77	2SA1027R
Q2	8-729-612-77	2SA1027R
Q3	8-729-612-77	2SA1027R
Q4	8-729-612-77	2SA1027R
Q5	8-729-612-77	2SA1027R
Q6	8-729-612-77	2SA1027R
Q7	8-729-612-77	2SA1027R
Q8	8-729-606-33	2SC2603-F
Q9	8-729-606-33	2SC2603-F
Q10	8-729-606-33	2SC2603-F
Q11	8-729-606-33	2SC2603-F

NOTES:

1. **The shaded and ⚠ -marked components are critical to safety. Replace only with same components as specified.**
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

Ref. No.	Parts No.	Description
S1	**1-552-539-00**	**KEY "RESET"**
S3	**1-552-539-00**	**KEY "MARK IN-2"**
S4	**1-553-003-00**	**LEVER "MEMORY"**
S5	**1-552-539-00**	**KEY "SEARCH"**
S6	**1-552-539-00**	**KEY "CUT OUT"**
S7	**1-552-539-00**	**KEY "PAUSE"**
S8	**1-552-539-00**	**KEY "EDIT"**
S9	**1-552-539-00**	**KEY "FF"**
S10	**1-552-539-00**	**KEY "REC"**
S11	**1-552-539-00**	**KEY "PLAY"**
S12	**1-552-539-00**	**KEY "PREROL"**
S13	**1-552-539-00**	**KEY "REW"**
S14	**1-552-539-00**	**KEY "EJECT"**
S15	**1-552-539-00**	**KEY "STOP"**
S16	**1-552-539-00**	**KEY "AUDIO-2"**
S17	**1-516-995-00**	**LEVER "INPUT SELECT"**
S18	**1-552-539-00**	**KEY "AUDIO-1"**
S19	**1-516-995-00**	**LEVER "MODE SELECT"**
S20	**1-552-539-00**	**KEY "VIDEO"**
S21	**1-552-539-00**	**KEY "ASSEMBLE"**
S22	**1-516-963-00**	**LEVER "AUDIO MONITOR"**

Ref. No.	Parts No.	Description
LM-7 BOARD		
	1-603-767-00	PRINTED CIRCUIT BOARD, LM-7

NOTES:

1. **The shaded and ⚠ -marked components are critical to safety. Replace only with same components as specified.**
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

MC-17, MI-3, ML-1

MC-17 BOARD

Ref. No.	Parts No.	Description
	1-604-970-00	PRINTED CIRCUIT BOARD, MC-17
PL1	**1-518-462-00**	**12V, 55mA FOR AUDIO CH-1 METER**
PL2	**1-518-462-00**	**12V, 55mA FOR AUDIO CH-2 METER**
PL3	**1-518-462-00**	**12V, 55mA FOR VIDEO/TRACKING METER**
R1	**1-212-376-00**	**METAL 22 5% 1W**
⚠ **R3**	**1-202-856-00**	**SOLID 22 30% 1/4W**
⚠ **R4**	**1-202-856-00**	**SOLID 22 30% 1/4W**
⚠ **R5**	**1-202-856-00**	**SOLID 22 30% 1/4W**
RV1	**1-226-395-00**	**VAR, CARBON 22K (B) "AUDIO CH-1 LEVEL"**
RV2	**1-226-395-00**	**VAR, CARBON 22K (B) "AUDIO CH-2 LEVEL"**
RV3	**1-224-524-00**	**VAR, CARBON 10K (B) "VIDEO"**
RV4	**1-226-983-00**	**VAR, CARBON 100K (B) "TRACKING"**
S1	**1-553-003-00**	**SLIDE "AUDIO LIMITER"**
S2	**1-553-003-00**	**SLIDE "VIDEO LEVEL"**

MI-3 BOARD

Ref. No.	Parts No.	Description
	1-603-732-00	PRINTED CIRCUIT BOARD, MI-3

ML-1 BOARD

Ref. No.	Parts No.	Description
	1-603-588-00	PRINTED CIRCUIT BOARD, ML-1
	1-517-072-00	**HOLDER, LAMP**
TM1	**1-548-119-00**	**HOURS METER**

NOTES:

1. **The shaded and ⚠ -marked components are critical to safety.**
   Replace only with same components as specified.
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

MP-12A BOARD with CB-6 BOARD

Ref. No.	Parts No.	Description
	A-6711-287-A	MOUNTED CIRCUIT BOARD, MP-12A WITH CB-6

All the diodes that are not listed in this board are 1S1555 (Parts No. 8-719-815-55)

CB-6 BOARD

Ref. No.	Parts No.	Description
	1-604-971-00	PRINTED CIRCUIT BOARD, CB-6
CN1	**1-561-336-00**	**RECEPTACLE, BNC "VIDEO-1 IN"**
CN2	**1-561-336-00**	**RECEPTACLE, BNC "VIDEO-2 IN"**
R1	**1-214-105-00**	**METAL, 75 1% 1/4W**
S1	**1-516-970-00**	**SLIDE, "75Ω"**

MP-12A BOARD

Ref. No.	Parts No.	Description
C11	**1-107-158-00**	**MICA 30PF 5% 500V**
C14	**1-107-206-00**	**MICA 15PF 5% 500V**
C34	**1-107-211-00**	**MICA 24PF 5% 500V**
C38	**1-102-759-00**	**CERAMIC 62PF 5% 50V**
C56	**1-107-210-00**	**MICA 22PF 5% 500V**
C60	**1-107-158-00**	**MICA 30PF 5% 500V**
C87	**1-109-683-00**	**MICA 270PF 1% 500V**
C89	**1-130-016-00**	**POLYPROPYLENE 680PF 5% 50V**
C90	**1-130-016-00**	**POLYPROPYLENE 680PF 5% 50V**
C91	**1-107-159-00**	**MICA 33PF 5% 500V**
C92	**1-109-687-00**	**MICA 390PF 1% 500V**
C184	**1-107-206-00**	**MICA 15PF 5% 500V**
C211	**1-102-113-00**	**CERAMIC 390PF 10% 50V**
C307	**1-107-042-00**	**MICA 2.2PF 0.5PF 500V**

Ref. No.	Parts No.	Description
CV1	**1-141-246-00**	**TRIMMER, 18PF**
CV2	**1-141-246-00**	**TRIMMER, 18PF**
CV3	**1-141-246-00**	**TRIMMER, 18PF**
D12	**8-719-915-43**	**FC54M**
D23	**8-719-815-59**	**1S1555-S**
D24	**8-719-127-07**	**RD2.7E-B**
D52	**8-719-709-25**	**1S1925-P**
D53	**8-719-709-25**	**1S1925-P**
D303	**8-719-110-07**	**RD10E**
D304	**8-719-110-07**	**RD10E**
D305	**8-719-151-07**	**RD5.1E-B**
D601	**8-719-709-25**	**1S1925-P**
D602	**8-719-709-25**	**1S1925-P**
DL2	**1-415-242-00**	**42nS**
DL3	**1-415-231-00**	**0.3μS**
FL1	**1-231-578-00**	**LPF**
FL2	**1-235-012-00**	**LPF**
FL3	**1-231-580-00**	**HPF**
FL4	**1-231-581-00**	**HPF**
IC1	**8-759-240-51**	**TC4051BP, C-MOS (CD4051BE; RCA)**
IC2	**8-751-880-00**	**CX-188 (SONY)**
IC3	**8-751-300-00**	**CX-130 (SONY)**
IC5	**8-751-310-00**	**CX-131A (SONY)**
IC6	**8-759-270-60**	**TA7060P (TOSHIBA)**
IC7	**8-751-300-00**	**CX-130 (SONY)**
IC8	**8-743-730-00**	**BX-373 (SONY)**
IC11	**8-751-300-00**	**CX-130 (SONY)**
IC12	**8-751-300-00**	**CX-130 (SONY)**
IC13	**8-751-340-00**	**CX-134A (SONY)**
IC14	**8-749-938-90**	**BX-389 (SONY)**
IC15	**8-759-270-69**	**TA7069P (TOSHIBA)**
IC16	**8-759-145-58**	**μPC4558C (NEC)**
IC701	**8-759-240-66**	**TC4066BP, C-MOS (CD4066AE/BE; RCA)**

NOTES:

1. **The shaded and ⚠-marked components are critical to safety. Replace only with same components as specified.**
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

Ref. No.	Parts No.	Description
LV3	1-425-879-00	BPF
LV21	1-407-566-00	VAR, 3.3
LV43	1-411-107-00	PEAKING
LV45	1-411-107-00	PEAKING
LV52	1-407-268-00	VAR, 1.5mH
Q1	8-724-375-01	2SC403C
Q2	8-724-375-01	2SC403C
Q3	8-729-612-77	2SA1027R
Q4	8-724-375-01	2SC403C
Q5	8-724-375-01	2SC403C
Q6	8-761-622-00	2SC1636
Q7	8-724-375-01	2SC403C
Q8	8-724-375-01	2SC403C
Q9	8-729-677-14	2SC2771
Q10	8-729-677-14	2SC2771
Q11	8-761-622-00	2SC1636
Q12	8-724-375-01	2SC403C
Q13	8-724-375-01	2SC403C
Q16	8-761-622-00	2SC1636
Q17	8-761-622-00	2SC1636
Q21	8-761-622-00	2SC1636
Q22	8-765-423-00	2SK152-3
Q23	8-761-622-00	2SC1636
Q24	8-765-423-00	2SK152-3
Q25	8-724-375-01	2SC403C
Q26	8-729-663-47	2SC1364
Q27	8-761-622-00	2SC1636
Q31	8-724-375-01	2SC403C
Q32	8-724-375-01	2SC403C
Q33	8-729-663-47	2SC1364
Q34	8-724-375-01	2SC403C
Q35	8-729-663-47	2SC1364
Q37	8-729-612-77	2SA1027R
Q38	8-729-663-47	2SC1364
Q39	8-729-663-47	2SC1364
Q301	8-729-612-77	2SA1027R
Q401	8-724-375-01	2SC403C
Q402	8-724-375-01	2SC403C
Q403	8-724-375-01	2SC403C
Q601	8-724-375-01	2SC403C

Ref. No.	Parts No.	Description
Q602	8-724-375-01	2SC403C
Q605	8-724-375-01	2SC403C
Q606	8-724-375-01	2SC403C
Q607	8-724-375-01	2SC403C
Q701	8-724-375-01	2SC403C
Q702	8-724-375-01	2SC403C
Q703	8-729-103-43	2SB734
Q704	8-724-375-01	2SC403C
Q801	8-729-612-77	2SA1027R
Q802	8-724-375-01	2SC403C
R106	1-214-125-00	METAL 510 1% 1/4W
R107	1-214-136-00	METAL 1.5K 1% 1/4W
R153	1-214-091-00	METAL 20 1% 1/4W
R154	1-214-091-00	METAL 20 1% 1/4W
R155	1-214-091-00	METAL 20 1% 1/4W
R156	1-214-091-00	METAL 20 1% 1/4W
R625	1-214-117-00	METAL 240 1% 1/4W
R626	1-214-119-00	METAL 300 1% 1/4W
RV1	1-224-251-XX	VAR, METAL 4.7K (B)
RV2	1-224-250-XX	VAR, METAL 2.2K (B)
RV3	1-224-250-XX	VAR, METAL 2.2K (B)
RV4	1-224-251-XX	VAR, METAL 4.7K (B)
RV5	1-224-251-XX	VAR, METAL 4.7K (B)
RV6	1-224-248-XX	VAR, METAL 470 (B)
RV7	1-224-251-XX	VAR, METAL 4.7K (B)
RV8	1-224-249-XX	VAR, METAL 1K (B)
RV11	1-224-251-XX	VAR, METAL 4.7K (B)
RV12	1-224-248-XX	VAR, METAL 470 (B)
RV13	1-224-248-XX	VAR, METAL 470 (B)
RV14	1-224-250-XX	VAR, METAL 2.2K (B)
RV15	1-224-250-XX	VAR, METAL 2.2K (B)
RV16	1-224-250-XX	VAR, METAL 2.2K (B)
RV17	1-224-249-XX	VAR, METAL 1K (B)
RV18	1-224-251-XX	VAR, METAL 4.7K (B)
RV19	1-224-251-XX	VAR, METAL 4.7K (B)
RV20	1-224-250-XX	VAR, METAL 2.2K (B)
RV22	1-224-250-XX	VAR, METAL 2.2K (B)
RV31	1-224-871-00	VAR, METAL 1M (B)

NOTES:

1. **The shaded and ⚠ -marked components are critical to safety.**
   Replace only with same components as specified.

2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

Ref. No.	Parts No.	Description
RV61	**1-224-248-XX**	**VAR, METAL 470 (B)**
RV62	**1-224-248-XX**	**VAR, METAL 470 (B)**
RV401	**1-224-250-XX**	**VAR, METAL 2.2K (B)**
RV601	**1-224-252-XX**	**VAR, METAL 10K (B)**
RV701	**1-224-254-XX**	**VAR, METAL 47K (B)**
RV702	**1-224-250-XX**	**VAR, METAL 2.2K (B)**
S1	**1-552-101-00**	**SLIDE, "NOISE CANCEL"**
T1	**1-425-880-21**	**BURST AMP.**
T2	**1-426-017-00**	**AF**
T3	**1-426-066-00**	**RF**
T4	**1-426-066-00**	**RF**
T5	**1-426-018-00**	**AF**
T6	**1-426-018-00**	**AF**
TH1	**1-800-200-00**	**S-3K**
X1	**1-527-511-00**	**OSC., 5.119166 MHz**
X2	**1-527-231-00**	**OSC., 4.433618 MHz**

MR-6 BOARD

Ref. No.	Parts No.	Description
	⚠ A-6725-232-B	MOUNTED CIRCUIT BOARD, MR-6

All the diodes that are not listed in this board are 1S1555 (Parts No. 8-719-815-55)

Ref. No.	Parts No.	Description
C5	**1-131-370-00**	**TANTALUM 6.8 10% 25V**
C6	**1-131-370-00**	**TANTALUM 6.8 10% 25V**
C12	**1-131-370-00**	**TANTALUM 6.8 10% 25V**
C15	**1-131-341-00**	**TANTALUM 0.1 10% 25V**
D2	**8-719-200-02**	**10E-2**
D3	**8-719-200-02**	**10E-2**
D4	**8-719-200-02**	**10E-2**
D5	**8-719-200-02**	**10E-2**
D6	**8-719-200-02**	**10E-2**
D7	**8-719-200-02**	**10E-2**
D12	**8-719-200-02**	**10E-2**
D13	**8-719-200-02**	**10E-2**
D14	**8-719-200-02**	**10E-2**
D15	**8-719-200-02**	**10E-2**
D16	**8-719-200-02**	**10E-2**
D17	**8-719-200-02**	**10E-2**
D31	**8-719-200-02**	**10E-2**
D32	**8-719-200-02**	**10E-2**
D33	**8-719-200-02**	**10E-2**
D34	**8-719-200-02**	**10E-2**
D35	**8-719-200-02**	**10E-2**
D36	**8-719-200-02**	**10E-2**
D37	**8-719-200-02**	**10E-2**
IC1	**8-759-135-80**	**μPC358C (LM358JG; TI)**
IC2	**8-759-135-80**	**μPC358C (LM358JG; TI)**
IC3	**8-759-240-66**	**TC4066BP, C-MOS (CD4066AE/BE; RCA)**
IC4	**8-759-240-69**	**TC4069UBP, C-MOS (CD4069UBE; RCA)**
IC5	**8-759-645-17**	**M54517P (MITSUBISHI)**
IC6	**8-759-345-38**	**HD14538BP, C-MOS (MC14538BCP; MOTOROLA)**

NOTES:

1. **The shaded and ⚠ -marked components are critical to safety. Replace only with same components as specified.**
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

Ref. No.	Parts No.	Description
Q1	**8-729-663-47**	**2SC1364**
Q2	**8-729-374-02**	**2SB740**
Q3	**8-760-413-10**	**2SC1475**
Q4	**8-729-374-02**	**2SB740**
Q5	**8-729-663-47**	**2SC1364**
Q6	**8-760-413-10**	**2SC1475**
Q7	**8-729-663-47**	**2SC1364**
Q8	**8-729-663-47**	**2SC1364**
Q9	**8-729-663-47**	**2SC1364**
Q10	**8-729-663-47**	**2SC1364**
Q11	**8-729-663-47**	**2SC1364**
Q12	**8-729-374-02**	**2SB740**
Q13	**8-760-413-10**	**2SC1475**
Q14	**8-729-374-02**	**2SB740**
Q15	**8-729-663-47**	**2SC1364**
Q16	**8-760-413-10**	**2SC1475**
Q17	**8-729-663-47**	**2SC1364**
Q18	**8-729-663-47**	**2SC1364**
Q19	**8-729-663-47**	**2SC1364**
Q20	**8-729-663-47**	**2SC1364**
Q25	**8-760-413-10**	**2SC1475**
Q26	**8-729-199-80**	**2SD998**
Q27	**8-729-663-47**	**2SC1364**
Q28	**8-729-663-47**	**2SC1364**
Q31	**8-729-199-80**	**2SD998**
Q32	**8-729-811-11**	**2SD1111**
Q33	**8-729-663-47**	**2SC1364**
Q34	**8-729-199-80**	**2SD998**
Q35	**8-729-811-11**	**2SD1111**
Q36	**8-729-663-47**	**2SC1364**
Q37	**8-729-663-47**	**2SC1364**
Q38	**8-729-199-80**	**2SD998**
Q39	**8-729-663-47**	**2SC1364**
Q40	**8-729-663-47**	**2SC1364**
Q41	**8-729-663-47**	**2SC1364**
⚠ R63	**1-210-859-00**	**CARBON 1.2 1/8W 5%**
⚠ R73	**1-210-859-00**	**CARBON 1.2 1/8W 5%**
⚠ R83	**1-210-859-00**	**CARBON 1.2 1/8W 5%**
⚠ R91	**1-207-653-00**	**WIREWOUND 4.7 4W 10%**

Ref. No.	Parts No.	Description
RV1	**1-224-251-XX**	**VAR, METAL 4.7K (B)**
RV2	**1-224-251-XX**	**VAR, METAL 4.7K (B)**
RV3	**1-224-251-XX**	**VAR, METAL 4.7K (B)**
RV4	**1-224-251-XX**	**VAR, METAL 4.7K (B)**

NOTES:

1. **The shaded and ⚠ -marked components are critical to safety.**
Replace only with same components as specified.

2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

PD-16 BOARD

Ref. No.	Parts No.	Description
⚠	A-6717-212-A	MOUNTED CIRCUIT BOARD, PD-16
D1	**8-719-200-02**	**10E-2**
D2	**8-719-200-02**	**10E-2**
D3	**8-719-200-02**	**10E-2**
D4	**8-719-200-02**	**10E-2**
D5	**8-719-200-02**	**10E-2**
D6	**8-719-200-02**	**10E-2**
D7	**8-719-200-02**	**10E-2**
D8	**8-719-200-02**	**10E-2**
D9	**8-719-200-02**	**10E-2**
D10	**8-719-200-02**	**10E-2**
D11	**8-719-200-02**	**10E-2**
D12	**8-719-200-02**	**10E-2**
D13	**8-719-200-02**	**10E-2**
D14	**8-719-200-02**	**10E-2**
D15	**8-719-200-02**	**10E-2**
D16	**8-719-904-55**	**GL-5HD5**
Q1	**8-729-811-11**	**2SD1111**
Q2	**8-729-663-47**	**2SC1364**
Q3	**8-729-199-80**	**2SD998**
Q4	**8-729-811-11**	**2SD1111**
Q5	**8-729-663-47**	**2SC1364**
Q6	**8-729-199-80**	**2SD998**
Q7	**8-729-811-11**	**2SD1111**
Q8	**8-729-663-47**	**2SC1364**
Q9	**8-729-199-80**	**2SD998**
Q10	**8-729-811-11**	**2SD1111**
Q11	**8-729-663-47**	**2SC1364**
Q12	**8-729-199-80**	**2SD998**
Q13	**8-729-811-11**	**2SD1111**
Q14	**8-729-663-47**	**2SC1364**
Q15	**8-729-199-80**	**2SD998**

Ref. No.	Parts No.	Description
⚠ **R4**	**1-247-072-00**	**CARBON 1.2 5% 1/4W**
⚠ **R8**	**1-247-072-00**	**CARBON 1.2 5% 1/4W**
⚠ **R15**	**1-247-072-00**	**CARBON 1.2 5% 1/4W**
⚠ **R19**	**1-247-072-00**	**CARBON 1.2 5% 1/4W**
⚠ **R23**	**1-247-072-00**	**CARBON 1.2 5% 1/4W**

NOTES:

1. **The shaded and ⚠ -marked components are critical to safety.**
   Replace only with same components as specified.
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

PH-4 BOARD

Ref. No.	parts No.	Description
	1-603-589-00	PRINTED CIRCUIT BOARD, PH-4
PC1	**1-806-232-11**	**CdS, MB-1102 "TENSION REGULATOR"**

PH-5 BOARD

Ref. No.	parts No.	Description
	1-603-737-00	PRINTED CIRCUIT BOARD, PH-5
D1	**8-719-951-04**	**LED, BR5104S**
Q1	**8-729-810-20**	**PHOTO, SPS102**

PT-9 BOARD

Ref. No.	Parts No.	Description
	1-605-018-00	PRINTED CIRCUIT BOARD, PT-9
D1	**8-719-100-52**	**5P2M (PT-9D)**
Q1	**8-729-283-42**	**2SB834 (PT-9A)**
Q1	**8-729-377-13**	**2SA771 (PT-9B)**
Q1	**8-729-331-53**	**2SC2315 (PT-9C)**

NOTES:

1. **The shaded and ⚠-marked components are critical to safety.**
Replace only with same components as specified.

2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

RE-5 BOARD

Ref. No.	Parts No.	Description
	⚠ A-6711-276-A	MOUNTED CIRCUIT BOARD, RE-5
	All the diodes that are not listed in this board are 1S1555 (Parts No. 8-719-815-55)	
C6	**1-109-570-00**	**MICA 360PF 5% 500V**
C16	**1-109-570-00**	**MICA 360PF 5% 500V**
Q1	**8-724-375-01**	**2SC403C**
Q2	**8-761-622-00**	**2SC1636**
Q3	**8-724-375-01**	**2SC403C**
Q4	**8-729-177-43**	**2SD774**
Q5	**8-729-374-02**	**2SB740**
Q6	**8-761-622-00**	**2SC1636**
Q7	**8-724-375-01**	**2SC403C**
Q8	**8-729-177-43**	**2SD774**
Q9	**8-729-374-02**	**2SB740**
⚠ R9	**1-246-418-15**	**5.1 5% 1/4W**
⚠ R10	**1-246-418-15**	**5.1 5% 1/4W**
⚠ R19	**1-246-418-15**	**5.1 5% 1/4W**
⚠ R20	**1-246-418-15**	**5.1 5% 1/4W**
RV1	**1-224-660-00**	**VAR, METAL 1K (B)**
RV2	**1-224-660-00**	**VAR, METAL 1K (B)**

SV-31A BOARD

Ref. No.	Parts No.	Description
	⚠ A-6715-122-B	MOUNTED CIRCUIT BOARD, SV-31A
	All the diodes that are not listed in this board are 1S1555 (Parts No. 8-719-815-55)	
C14	**1-102-106-00**	**CERAMIC 100PF 10% 50V**
C16	**1-102-114-00**	**CERAMIC 470PF 10% 50V**
C26	**1-102-110-00**	**CERAMIC 220PF 10% 50V**
C35	**1-102-106-00**	**CERAMIC 100PF 10% 50V**
C37	**1-130-224-00**	**POLYPROPYLENE 0.015 5% 50V**
C75	**1-102-106-00**	**CERAMIC 100PF 10% 50V**
C76	**1-102-106-00**	**CERAMIC 100PF 10% 50V**
C88	**1-102-110-00**	**CERAMIC 220PF 10% 50V**
C96	**1-102-106-00**	**CERAMIC 100PF 10% 50V**
C601	**1-161-185-00**	**CERAMIC 0.01 5% 25V**
D15	**8-719-982-04**	**ERB81-004**
D16	**8-719-982-04**	**ERB81-004**
D24	**8-719-156-07**	**RD5.6E-B**
IC1	**8-759-135-80**	**μPC358C (LM358JG; TI)**
IC2	**8-759-345-38**	**HD14538BP, C-MOS (MC14538BCP; MOTOROLA)**
IC3	**8-759-240-11**	**TC4011BP, C-MOS (CD4011AE/BE; RCA)**
IC4	**8-759-745-50**	**NJM4558D−DS (RC4558; RAYTHEON)**
IC5	**8-759-240-53**	**TC4053BP, C-MOS (CD4053BE; RCA)**
IC6	**8-749-939-14**	**BX-3914 (SONY)**
IC7	**8-751-941-04**	**CX-194B-4 (SONY)**
IC8	**8-759-240-53**	**TC4053BP, C-MOS (CD4053BE; RCA)**
IC9	**8-759-045-38**	**MC14538BCP, C-MOS (MOTOROLA)**
IC10	**8-759-132-40**	**μPC324C (NSC)**
IC11	**8-759-135-80**	**μPC358C (LM358JG; TI)**
IC12	**8-759-240-53**	**TC4053BP, C-MOS (CD4053BE; RCA)**
IC13	**8-759-135-80**	**μPC358C (NSC)**
IC14	**8-759-240-53**	**TC4053BP, C-MOS (CD4053BE; RCA)**
IC15	**8-759-135-80**	**μPC358C (LM358JG; TI)**

NOTES:

1. **The shaded and ⚠ -marked components are critical to safety. Replace only with same components as specified.**
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

Ref. No.	Parts No.	Description
IC16	8-759-132-40	μPC324C (NSC)
IC17	8-759-745-60	NJM4560D (JRC)
IC18	8-759-240-93	TC4093BP, C-MOS (CD4093BE; RCA)
IC19	8-759-240-30	TC4030BP, C-MOS (CD4030AE/BE; RCA)
IC20	8-759-240-82	TC4082BP, C-MOS (CD4082BE; RCA)
IC21	8-759-240-25	TC4025BP, C-MOS (CD4025AE/BE; RCA)
IC22	8-759-240-01	TC4001BP, C-MOS (CD4001AE/BE; RCA)
IC23	8-759-240-01	TC4001BP, C-MOS (CD4001AE/BE; RCA)
IC24	8-759-240-30	TC4030BP, C-MOS (CD4030AE/BE; RCA)
IC25	8-759-045-38	MC14538BCP, C-MOS (MOTOROLA)
IC26	8-759-135-80	μPC358C (LM358JG; TI)
IC27	8-749-909-15	BX-3915A (SONY)
IC28	8-759-240-53	TC4053BP, C-MOS (CD4053BE; RCA)
IC29	8-759-135-80	μPC358C (LM358JG; TI)
IC30	8-759-135-80	μPC358C (LM358JG; TI)
IC31	8-759-240-69	TC4069UBP, C-MOS (CD4069UBE; RCA)
IC32	8-759-729-03	NJM2903D (JRC)
IC33	1-464-259-00	CORRECTION UNIT SWITCHING
Q1	8-729-663-47	2SC1364
Q2	8-729-663-47	2SC1364
Q3	8-729-663-47	2SC1364
Q4	8-729-663-47	2SC1364
Q5	8-729-663-47	2SC1364
Q6	8-729-663-47	2SC1364
Q7	8-729-663-47	2SC1364
Q8	8-729-103-43	2SB734
Q10	8-729-663-47	2SC1364
Q12	8-729-177-43	2SD774
Q13	8-729-663-47	2SC1364
Q14	8-729-663-47	2SC1364
Q15	8-729-663-47	2SC1364
Q16	8-729-663-47	2SC1364
Q17	8-729-663-47	2SC1364
Q18	8-729-602-67	2SA1026-7
Q19	8-729-663-47	2SC1364
Q20	8-729-663-47	2SC1364
Q21	8-729-663-47	2SC1364
Q22	8-729-663-47	2SC1364

Ref. No.	Parts No.	Description
Q23	8-729-663-47	2SC1364
Q24	8-729-663-47	2SC1364
Q25	8-729-663-47	2SC1364
Q26	8-729-663-47	2SC1364
Q27	8-729-663-47	2SC1364
Q28	8-729-663-47	2SC1364
Q29	8-729-663-47	2SC1364
Q30	8-729-663-47	2SC1364
Q31	8-729-663-47	2SC1364
Q32	8-729-602-67	2SA1026-7
Q33	8-729-663-47	2SC1364
Q34	8-761-622-00	2SC1636
Q35	8-729-663-47	2SC1364
Q36	8-729-663-47	2SC1364
Q37	8-729-177-43	2SD774
Q38	8-729-663-47	2SC1364
Q39	8-729-602-67	2SA1026-7
Q501	8-729-663-47	2SC1364
Q502	8-729-663-48	2SC1364-8
Q503	8-729-663-47	2SC1364
Q504	8-729-663-47	2SC1364
Q505	8-729-663-47	2SC1364
⚠ R30	1-207-636-00	WIREWOUND 100 10% 3W
R87	1-214-156-00	METAL 10K 1% 1/4W
⚠ R90	1-207-636-00	WIREWOUND 100 10% 3W
R200	1-214-178-00	METAL 82K 1% 1/4W
R201	1-212-720-00	METAL 560K 1% 1/2W
R285	1-244-853-00	CARBON 150 5% 1/2W
R343	1-207-634-00	WIREWOUND 68 10% 3W
RV1	1-224-255-XX	VAR, METAL 100K (B)
RV2	1-224-254-XX	VAR, METAL 47K (B)
RV3	1-224-254-XX	VAR, METAL 47K (B)
RV4	.-224-254-XX	VAR, METAL 47K (B)
RV5	1-224-251-XX	VAR, METAL 4.7K (B)
RV6	1-224-134-XX	VAR, METAL 470K (B)
RV7	1-224-254-XX	VAR, METAL 47K (B)
RV8	1-224-248-XX	VAR, METAL 470 (B)
RV9	1-224-252-XX	VAR, METAL 10K (B)
RV10	1-224-251-XX	VAR, METAL 4.7K (B)

NOTES:

1. **The shaded and ⚠ -marked components are critical to safety.**
   Replace only with same components as specified.

2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

Ref. No.	Parts No.	Description
RV11	**1-224-251-XX**	**VAR, METAL 4.7K (B)**
RV12	**1-224-250-XX**	**VAR, METAL 2.2K (B)**
RV13	**1-224-250-XX**	**VAR, METAL 2.2K (B)**
RV14	**1-224-250-XX**	**VAR, METAL 2.2K (B)**
RV15	**1-224-252-XX**	**VAR, METAL 10K (B)**
RV16	**1-224-254-XX**	**VAR, METAL 47K (B)**
RV17	**1-224-248-XX**	**VAR, METAL 470 (B)**
RV18	**1-224-254-XX**	**VAR, METAL 47K (B)**
X1	**1-527-832-00**	**OSC, 4.433619MHz**

Ref. No.	Parts No.	Description
SW-43 BOARD		
	1-603-434-00	PRINTED CIRCUIT BOARD, SW-43
IC1	**8-719-104-42**	**PHOTOINTERRUPTER, PS4005 (NEC)**
SW-46 BOARD		
	1-603-590-00	PRINTED CIRCUIT BOARD, SW-46
IC1	**8-719-104-42**	**PHOTOINTERRUPTER, PS4005 (NEC)**
IC2	**8-719-104-42**	**PHOTOINTERRUPTER, PS4005 (NEC)**

NOTES:

1. **The shaded and ⚠ -marked components are critical to safety.**
   Replace only with same components as specified.

2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

SW-50 BOARD

Ref. No.	Parts No.	Description
	1-603-435-00	PRINTED CIRCUIT BOARD, SW-50
IC1	**8-719-104-42**	**PHOTOINTERRUPTER, PS4005 (NEC)**

SY-68A BOARD

Ref. No.	Parts No.	Description
	⚠A-6717-210-A	MOUNTED CIRCUIT BOARD, SY-68A S/N UP TO 10180 (AEP) S/N UP TO 10020 (UK)
	All the diodes that are not listed in this board are 1S1555 (Parts No. 8-719-815-55)	
C2	**1-123-311-00**	**ELECT 1000 20% 10V**
C3	**1-123-311-00**	**ELECT 1000 20% 10V**
C11	**1-131-408-00**	**TANTALUM 1 10% 35V**
C12	**1-102-962-00**	**CERAMIC 30PF 5% 50V**
C13	**1-102-962-00**	**CERAMIC 30PF 5% 50V**
C17	**1-131-341-00**	**TANTALUM 0.1 20% 35V**
C21	**1-131-404-00**	**TANTALUM 0.22 10% 35V**
C23	**1-102-114-00**	**CERAMIC 470PF 10% 50V**
C24	**1-102-114-00**	**CERAMIC 470PF 10% 50V**
C32	**1-102-110-00**	**CERAMIC 220PF 10% 50V**
C33	**1-102-110-00**	**CERAMIC 220PF 10% 50V**
C34	**1-102-110-00**	**CERAMIC 220PF 10% 50V**
C35	**1-102-110-00**	**CERAMIC 220PF 10% 50V**
C60	**1-102-114-00**	**CERAMIC 470PF 10% 50V**
C62	**1-131-404-00**	**TANTALUM 0.22 10% 35V**
CN1	1-560-454-00	40P
CN21	1-560-363-00	RECEPTACLE, 12P
	1-561-521-00	HOUSING, 12P
CN22	1-560-363-00	RECEPTACLE, 12P
	1-561-521-00	HOUSING, 12P
CN23	1-560-363-00	RECEPTACLE, 12P
	1-561-521-00	HOUSING, 12P
D9	**8-719-147-77**	**RD4.7E-B**
IC1	**8-759-906-80**	**LH0080 N-MOS (SHARP)**
IC2	**8-759-906-82**	**LH0082, N-MOS (SHARP)**
IC3	**8-759-754-50**	**2716S68E1D, P-ROM (OKI)**
IC4	**8-759-755-05**	**2716S68E2E, P-ROM (OKI)**
IC5	**8-759-755-06**	**2716S68E3E, P-ROM (OKI)**
IC6	**8-759-104-44**	**UPD444C, C-MOS (NEC)**
IC7	**8-759-104-44**	**UPD444C, C-MOS (NEC)**
IC8	**8-759-223-68**	**TC40H368P, C-MOS (TOSHIBA)**
IC9	**8-759-220-02**	**TC40H002P, C-MOS (TOSHIBA)**
IC10	**8-759-903-90**	**SN74LS390N (TI)**

NOTES:

1. **The shaded and ⚠-marked components are critical to safety. Replace only with same components as specified.**
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

Ref. No.	Parts No.	Description
IC11	**8-759-901-39**	**SN74LS139N (TI)**
IC12	**8-759-902-45**	**SN74LS245N (TI)**
IC13	**8-759-901-38**	**SN74LS138N (TI)**
IC14	**8-759-901-38**	**SN74LS138N (TI)**
IC21	**8-759-045-03**	**MC14503BCP, C-MOS (MOTOROLA)**
IC22	**8-759-045-03**	**MC14503BCP, C-MOS (MOTOROLA)**
IC23	**8-759-045-03**	**MC14503BCP, C-MOS (MOTOROLA)**
IC24	**8-759-045-03**	**MC14503BCP, C-MOS (MOTOROLA)**
IC25	**8-759-045-03**	**MC14503BCP, C-MOS (MOTOROLA)**
IC26	**8-759-045-03**	**MC14503BCP, C-MOS (MOTOROLA)**
IC27	**8-759-045-03**	**MC14503BCP, C-MOS (MOTOROLA)**
IC28	**8-759-045-03**	**MC14503BCP, C-MOS (MOTOROLA)**
IC29	**8-759-045-03**	**MC14503BCP, C-MOS (MOTOROLA)**
IC30	**8-759-045-03**	**MC14503BCP, C-MOS (MOTOROLA)**
IC41	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**
IC42	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**
IC43	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**
IC44	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**
IC45	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**
IC46	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**
IC47	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**
IC48	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**
IC49	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**
IC50	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**
IC51	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**
IC52	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**
IC53	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**
IC54	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**
IC55	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**
IC56	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**
IC61	**8-759-240-24**	**TC4024BP, C-MOS (CD4024AE/BE; RCA)**
IC101	**8-759-987-47**	**MB8747, C-MOS (FUJITSU)**
IC102	**8-759-240-21**	**TC4021BP, C-MOS (CD4021AE/BE; RCA)**
IC103	**8-759-240-21**	**TC4021BP, C-MOS (CD4021AE/BE; RCA)**
IC104	**8-759-240-22**	**TC4022BP, C-MOS (CD4022AE/BE; RCA)**
IC105	**8-759-240-24**	**TC4024BP, C-MOS (CD4024AE/BE; RCA)**
IC107	**8-759-245-28**	**TC4528BP, C-MOS (MC14528BCP; MOTOROLA)**
IC108	**8-759-240-53**	**TC4053BP, C-MOS (CD4053BE; RCA)**
IC109	**8-759-245-20**	**TC4520BP, C-MOS (MC14520BCP; MOTOROLA)**
IC110	**8-759-345-38**	**HD14538BP, C-MOS (MC14538BCP; MOTOROLA)**
IC111	**8-759-900-04**	**SN74LS04N (TI)**
IC112	**8-759-045-03**	**MC14503BCP, C-MOS (MOTOROLA)**
IC113	**8-759-240-69**	**TC4069UBP, C-MOS (CD4069UBE; RCA)**
IC114	**8-759-240-69**	**TC4069UBP, C-MOS (CD4069UBE; RCA)**
IC115	**8-759-240-69**	**TC4069UBP, C-MOS (CD4069UBE; RCA)**
IC116	**8-759-240-01**	**TC4001BP, C-MOS (CD4001AE/BE; RCA)**
IC117	**8-759-240-01**	**TC4001BP, C-MOS (CD4001AE/BE; RCA)**
IC118	**8-759-240-71**	**TC4071BP, C-MOS (CD4071BE; RCA)**
IC119	**8-759-240-71**	**TC4071BP, C-MOS (CD4071BE; RCA)**
IC120	**8-759-240-71**	**TC4071BP, C-MOS (CD4071BE; RCA)**
IC121	**8-759-240-71**	**TC4071BP, C-MOS (CD4071BE; RCA)**
IC122	**8-759-240-71**	**TC4071BP, C-MOS (CD4071BE; RCA)**
IC123	**8-759-240-71**	**TC4071BP, C-MOS (CD4071BE; RCA)**
IC124	**8-759-240-30**	**TC4030BP, C-MOS (CD4030AE/BE; RCA)**
IC125	**8-759-240-81**	**TC4081BP, C-MOS (CD4081BE; RCA)**

NOTES:

1. **The shaded and ⚠ -marked components are critical to safety. Replace only with same components as specified.**

2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

Ref. No.	Parts No.	Description
IC126	**8-759-240-81**	**TC4081BP, C-MOS (CD4081BE; RCA)**
IC127	**8-759-240-81**	**TC4081BP, C-MOS (CD4081BE; RCA)**
IC128	**8-759-240-81**	**TC4081BP, C-MOS (CD4081BE; RCA)**
IC129	**8-759-240-73**	**TC4073BP, C-MOS (CD4073BE; RCA)**
IC130	**8-759-240-73**	**TC4073BP, C-MOS (CD4073BE; RCA)**
IC131	**8-759-240-73**	**TC4073BP, C-MOS (CD4073BE; RCA)**
IC132	**8-759-240-73**	**TC4073BP, C-MOS (CD4073BE; RCA)**
IC133	**8-759-240-81**	**TC4081BP, C-MOS (CD4081BE; RCA)**
IC134	**8-759-240-69**	**TC4069UBP, C-MOS (CD4069UBE; RCA)**
IC202	**8-759-645-17**	**M54517P (MITSUBISHI)**
IC203	**8-759-645-17**	**M54517P (MITSUBISHI)**
IC204	**8-759-645-17**	**M54517P (MITSUBISHI)**
IC206	**8-759-645-17**	**M54517P (MITSUBISHI)**
IC207	**8-759-645-17**	**M54517P (MITSUBISHI)**
IC208	**8-759-645-17**	**M54517P (MITSUBISHI)**
IC209	**8-759-645-17**	**M54517P (MITSUBISHI)**
IC210	**8-759-645-17**	**M54517P (MITSUBISHI)**
IC351	**8-759-729-03**	**NJM2903D (JRC)**
IC352	**8-759-705-58**	**NJM4558D-D (RC4558; RAYTHEON)**
IC353	**8-759-145-58**	**μPC4558C (RC4558; RAYTHEON)**
IC354	**8-743-430-00**	**BX-343 (SONY)**
IC355	**8-759-729-03**	**NJM2903D (JRC)**
L2	**1-407-885-00**	**0.1mH**
Q1	**8-729-331-53**	**2SC2315**
Q2	**8-729-612-77**	**2SA1027R**
Q3	**8-729-663-47**	**2SC1364**
Q6	**8-729-631-02**	**2SC1310**
Q12	**8-729-663-47**	**2SC1364**
Q13	**8-729-663-47**	**2SC1364**
Q14	**8-729-663-47**	**2SC1364**
Q15	**8-729-663-47**	**2SC1364**
Q16	**8-729-663-47**	**2SC1364**
Q17	**8-729-103-43**	**2SB734**

Ref. No.	Parts No.	Description
Q18	**8-729-177-43**	**2SD774**
Q19	**8-729-663-47**	**2SC1364**
Q20	**8-729-663-47**	**2SC1364**
Q31	**8-729-663-47**	**2SC1364**
Q32	**8-729-663-47**	**2SC1364**
Q33	**8-729-663-47**	**2SC1364**
Q34	**8-729-663-47**	**2SC1364**
Q35	**8-729-663-47**	**2SC1364**
Q36	**8-729-663-47**	**2SC1364**
Q37	**8-729-663-47**	**2SC1364**
Q38	**8-729-663-47**	**2SC1364**
Q39	**8-729-663-47**	**2SC1364**
Q40	**8-729-663-47**	**2SC1364**
Q41	**8-729-663-47**	**2SC1364**
Q42	**8-729-663-47**	**2SC1364**
Q43	**8-729-663-47**	**2SC1364**
Q44	**8-729-663-47**	**2SC1364**
⚠ **R1**	**1-212-359-00**	**METAL 0.82 5% 1W**
R24	**1-210-829-00**	**CARBON 5.1M 5% 1/4W**
RV1	**1-224-249-XX**	**VAR, METAL 1K (B)**
RV2	**1-224-253-XX**	**VAR, METAL 22K (B)**
X1	**1-527-827-00**	**4.9152MHz**

NOTES:

1. **The shaded and ⚠ -marked components are critical to safety.**
Replace only with same components as specified.

2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

SY-68A BOARD

Ref. No.	Parts No.	Description
	⚠A-6717-220-A	MOUNTED CIRCUIT BOARD, SY-68A
		S/N 10181 ~ 12980 (AEP) S/N 10021 ~ 10620 (UK)
	1-606-505-00	PRINTED CIRCUIT BOARD, CM-13
		S/N 10181 ~ 10380 (AEP) S/N 10021 ~ 10120 (UK)
	⚠A-6717-220-B	MOUNTED CIRCUIT BOARD, SY-68A
		S/N 12981 ~ 15230 (AEP) S/N 10621 ~ 11100 (UK)
	⚠A-6717-220-C	MOUNTED CIRCUIT BOARD, SY-68A
		S/N 15231 AND LATER (AEP) S/N 11101 AND LATER (UK)

All the diodes that are not listed in this board are 1SS119 (Parts No. 8-719-911-19)

Ref. No.	Parts No.	Description
C3	**1-123-311-00**	**ELECT 1000 20% 10V**
C17	**1-131-341-00**	**TANTALUM 0.1 20% 35V**
C23	**1-102-114-00**	**CERAMIC 470PF 10% 50V**
C24	**1-102-114-00**	**CERAMIC 470PF 10% 50V**
C32	**1-102-110-00**	**CERAMIC 220PF 10% 50V**
C33	**1-102-110-00**	**CERAMIC 220PF 10% 50V**
C34	**1-102-110-00**	**CERAMIC 220PF 10% 50V**
C35	**1-102-110-00**	**CERAMIC 220PF 10% 50V**
C51	**1-102-110-00**	**CERAMIC 220PF 10% 50V**
C60	**1-102-114-00**	**CERAMIC 470PF 10% 50V**
CN1	1-564-391-11	40P
CN21	1-560-363-00	RECEPTACLE, 12P
	1-561-521-00	HOUSING, 12P
CN22	1-560-363-00	RECEPTACLE, 12P
	1-561-521-00	HOUSING, 12P
CN23	1-560-363-00	RECEPTACLE, 12P
	1-561-521-00	HOUSING, 12P
D9	**8-719-147-77**	**RD4.7E-B**

Ref. No.	Parts No.	Description
IC1	**8-759-241-75**	**TC40175BP, C-MOS (MI14175BCP; MOTOROLA)**
IC2	**8-759-241-75**	**TC40175BP, C-MOS (MI14175BCP; MOTOROLA)**
IC3	**8-759-345-03**	**HD14503BP, C-MOS (MC14503BCP; MOTOROLA)**
IC4	**8-759-345-03**	**HD14503BP, C-MOS (MC14503BCP; MOTOROLA)**
IC5	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**
IC6	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**
IC7	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**
IC8	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**
IC9	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**
IC10	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**
IC11	**8-759-345-03**	**HD14503BP, C-MOS (MC14503BCP; MOTOROLA)**
IC12	**8-759-220-02**	**TC40H002P, C-MOS (TOSHIBA)**
IC13	**8-759-223-68**	**TC40H368P, C-MOS (TOSHIBA)**
IC14	**8-759-903-90**	**SN74LS390N (TI)**
IC15	**8-759-901-39**	**SN74LS139N (TI)**
IC16	**8-759-104-44**	**μPD444C, C-MOS (NEC)**
IC17	**8-759-104-44**	**μPD444C, C-MOS (NEC)**
IC18	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**
IC19	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**
IC20	**8-759-901-38**	**SN74LS138N (TI)**
IC21	**8-759-901-38**	**SN74LS138N (TI)**
IC22	**8-759-906-82**	**LH0082, N-MOS (SHARP)**
IC23	**8-759-906-80**	**LH0080, N-MOS (SHARP)**
IC24	**8-759-758-16**	**MSM2716S68E1G, P-ROM (OKI)**
IC25	**8-759-758-17**	**MSM2716S68E2G, P-ROM (OKI)**
IC26	**8-759-758-18**	**MSM2716S68E3G, P-ROM (OKI)**
IC27	**8-759-902-45**	**SN74LS245N (TI)**
IC28	**8-759-240-24**	**TC4024BP, C-MOS (CD4024AE/BE; RCA)**
IC29	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**
IC30	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**

NOTES:

1. **The shaded and ⚠ -marked components are critical to safety.**
Replace only with same components as specified.

2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

Ref. No.	Parts No.	Description
IC31	**8-759-345-03**	**HD14503BP, C-MOS (MC14503BCP; MOTOROLA)**
IC32	**8-759-345-03**	**HD14503BP, C-MOS (MC14503BCP; MOTOROLA)**
IC33	**8-759-345-03**	**HD14503BP, C-MOS (MC14503BCP; MOTOROLA)**
IC34	**8-759-345-03**	**HD14503BP, C-MOS (MC14503BCP; MOTOROLA)**
IC35	**8-759-345-03**	**HD14503BP, C-MOS (MC14503BCP; MOTOROLA)**
IC36	**8-759-345-03**	**HD14503BP, C-MOS (MC14503BCP; MOTOROLA)**
IC37	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**
IC38	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**
IC39	**8-759-345-03**	**HD14503BP, C-MOS (MC14503BCP; MOTOROLA)**
IC40	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**
IC41	**8-759-241-75**	**TC40175BP, C-MOS (MC14175BCP; MOTOROLA)**
IC101	**8-759-645-17**	**M54517P (MITSUBISHI)**
IC102	**8-759-645-17**	**M54517P (MITSUBISHI)**
IC103	**8-759-645-17**	**M54517P (MITSUBISHI)**
IC104	**8-759-240-71**	**TC4071BP, C-MOS (CD4071BE; RCA)**
IC105	**8-759-240-81**	**TC4081BP, C-MOS (CD4081BE; RCA)**
IC106	**8-759-240-69**	**TC4069UBP, C-MOS (CD4069UBE; RCA)**
IC107	**8-759-645-17**	**M54517P (MITSUBISHI)**
IC108	**8-759-645-17**	**M54517P (MITSUBISHI)**
IC109	**8-759-729-03**	**NJM2903D (JRC)**
IC110	**8-759-729-03**	**NJM2903D (JRC)**
IC111	**8-759-745-50**	**NJM4558D-DS**
IC112	**8-759-145-58**	**μPC4558C (RC4558; RAYTHEON)**
IC114	**8-759-645-17**	**M54517P (MITSUBISHI)**
IC115	**8-759-245-20**	**TC4520BP, C-MOS (MC14520BCP; MOTOROLA)**
IC116	**8-743-430-00**	**BX-343 (SONY)**
IC117	**8-759-240-21**	**TC4021BP, C-MOS (CD4021AE/BE; RCA)**
IC118	**8-759-240-21**	**TC4021BP, C-MOS (CD4021AE/BE; RCA)**
IC119	**8-759-645-17**	**M54517P (MITSUBISHI)**
IC120	**8-759-240-81**	**TC4081BP, C-MOS (CD4081BE; RCA)**
IC121	**8-759-240-71**	**TC4071BP, C-MOS (CD4071BE; RCA)**
IC122	**8-759-240-81**	**TC4081BP, C-MOS (CD4081BE; RCA)**
IC123	**8-759-645-17**	**M54517P (MITSUBISHI)**
IC124	**8-759-240-01**	**TC4001BP, C-MOS (CD4001AE/BE; RCA)**
IC125	**8-759-240-69**	**TC4069UBP, C-MOS (CD4069UBE; RCA)**
IC126	**8-759-240-81**	**TC4081BP, C-MOS (CD4081BE; RCA)**
IC127	**8-759-240-22**	**TC4022BP, C-MOS (CD4022AE/BE; RCA)**
IC128	**8-759-240-71**	**TC4071BP, C-MOS (CD4071BE; RCA)**
IC129	**8-759-900-04**	**SN74LS04N (TI)**
IC130	**8-759-345-03**	**HD14503BP, C-MOS (MC14503BCP; MOTOROLA)**
IC131	**8-759-240-81**	**TC4081BP, C-MOS (CD4081BE; RCA)**
IC132	**8-759-240-73**	**TC4073BP, C-MOS (CD4073BE; RCA)**
IC133	**8-759-240-71**	**TC4071BP, C-MOS (CD4071BE; RCA)**
IC134	**8-759-240-71**	**TC4071BP, C-MOS (CD4071BE; RCA)**
IC135	**8-759-240-69**	**TC4069UBP, C-MOS (CD4069UBE; RCA)**
IC136	**8-759-987-47**	**MB8747, C-MOS (FUJITSU)**
IC137	**8-759-345-38**	**HD14538BP, C-MOS (MC14538BCP; MOTOROLA)**
IC138	**8-759-240-69**	**TC4069UBP, C-MOS (CD4069UBE; RCA)**
IC139	**8-759-240-53**	**TC4053BP, C-MOS (CD4053BE; RCA)**
IC140	**8-759-240-30**	**TC4030BP, C-MOS (CD4030AE/BE; RCA)**
IC141	**8-759-240-81**	**TC4081BP, C-MOS (CD4081BE; RCA)**
IC142	**8-759-345-38**	**HD14538BP, C-MOS (MC14538BCP; MOTOROLA)**
IC143	**8-759-240-71**	**TC4071BP, C-MOS (CD4071BE; RCA)**
IC144	**8-759-240-01**	**TC4001BP, C-MOS (CD4001AE/BE; RCA)**
IC145	**8-759-240-73**	**TC4073BP, C-MOS (CD4073BE; RCA)**
IC146	**8-759-240-73**	**TC4073BP, C-MOS (CD4073BE; RCA)**
IC147	**8-759-240-24**	**TC4024BP, C-MOS (CD4021AE/BE; RCA)**

NOTES:

1. **The shaded and ⚠-marked components are critical to safety.**
   Replace only with same components as specified.

2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

Ref. No.	Parts No.	Description
L2	**1-407-885-00**	**0.1mH**
Q1	**8-729-331-53**	**2SC2315**
Q2	**8-729-612-77**	**2SA1027R**
Q3	**8-729-606-33**	**2SC2603**
Q6	**8-729-606-33**	**2SC2603**
Q12	**8-729-606-33**	**2SC2603**
Q13	**8-729-606-33**	**2SC2603**
Q14	**8-729-606-33**	**2SC2603**
Q15	**8-729-102-03**	**2SD1020**
Q16	**8-729-606-33**	**2SC2603**
Q17	**8-729-103-43**	**2SB734**
Q18	**8-729-177-43**	**2SD774**
Q19	**8-729-606-33**	**2SC2603**
Q20	**8-729-606-33**	**2SC2603**
Q31	**8-729-606-33**	**2SC2603**
Q32	**8-729-606-33**	**2SC2603**
Q33	**8-729-606-33**	**2SC2603**
Q34	**8-729-606-33**	**2SC2603**
Q35	**8-729-606-33**	**2SC2603**
Q36	**8-729-606-33**	**2SC2603**
Q37	**8-729-606-33**	**2SC2603**
Q38	**8-729-606-33**	**2SC2603**
Q39	**8-729-606-33**	**2SC2603**
Q40	**8-729-606-33**	**2SC2603**
Q41	**8-729-606-32**	**2SC2603**
Q42	**8-729-606-33**	**2SC2603**
Q43	**8-729-606-33**	**2SC2603**
Q44	**8-729-606-33**	**2SC2603**
⚠ R1	**1-212-359-00**	**METAL 0.82 5% 1W**
R24	**1-210-829-00**	**CARBON 5.1M 5% 1/4W**
⚠ R401	**1-207-619-00**	**WIREWOUND 0.82 10% 3W**
RV1	**1-224-249-XX**	**VAR, METAL 1K (B)**
RV2	**1-224-253-XX**	**VAR, METAL 22K (B)**
RV3	**1-224-253-XX**	**VAR, METAL 22K (B)**
X1	**1-527-827-00**	**OSC., 4.9152MHz**

Ref. No.	Parts No.	Description
FRAME		
	1-226-996-21	**ROTARY ENCODER**
	⚠ 1-413-075-00	**SWITCHING REGULATOR (UR-02)**
	1-526-559-00	**SOCKET, FOR POWER TRANSISTOR**
	⚠ 1-534-698-XX	**CORD, POWER**
⚠ CN1001	**1-509-546-00**	**3P, AC INLET**
CN1005	**1-509-891-00**	**RECEPTACLE, BNC "VIDEO-1 OUT"**
CN1006	**1-509-891-00**	**RECEPTACLE, BNC "VIDEO-2 OUT"**
CN1007	**1-508-945-00**	**RECEPTACLE, 7P MALE "DUB IN"**
CN1008	**1-561-045-00**	**RECEPTACLE, 7P FEMALE "DUB OUT"**
CN1011	**1-509-891-00**	**RECEPTACLE, BNC "RF OUT"**
CN1012	**1-509-891-00**	**RECEPTACLE, BNC "SC IN"**
CN1013 **CN1014**	**1-507-732-00**	**JACK, PIN 2P "AUDIO LINE CH-1/L IN"** **"AUDIO LINE CH-2/R IN"**
CN1015	**1-507-251-XX**	**JACK JM-35 M-10 "AUDIO MONITOR"**
CN1016 **CN1017**	**1-507-732-00**	**JACK, PIN 2P "AUDIO LINE CH-1/L OUT"** **"AUDIO LINE CH-2/R OUT"**
CN1018	**1-507-473-XX**	**JACK JM-35 M-7A "RX DATA"**
CN1019 **CN1020**	**1-507-733-00**	**DUAL JACK "MIC CH-1/CH-2 IN"**
CN1021	**1-507-553-00**	**JACK "HEADPHONES"**
CN1022	**1-509-891-00**	**RECEPTACLE, BNC "EXT SYNC IN"**
CN1024	**1-561-671-00**	**RECEPTACLE, 8P FEMALE "TV"**
	1-560-553-00	**CONTACT**
CN1025	**1-561-583-00**	**RECEPTACLE, 33P FEMALE "REMOTE"**
	1-560-066-00	**CONTACT**

NOTES:

1. **The shaded and ⚠ -marked components are critical to safety. Replace only with same components as specified.**
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

FRAME

Ref. No.	Parts No.	Description
CS1001	**1-586-633-00**	**CONDENSATION SENSOR**
H1002	**A-6709-398-A**	**DRUM ASS'Y UPPER DUR-24-R**
H1003	**8-825-513-20**	**EPP170-58 "CTL PB/FULL ERASE"**
H1004	**8-829-358-31**	**EPP150-5803B "AUDIO ERASE / CTL R/P / AUDIO R/P"**
M1001	**A-6709-394-A**	**HEAD DRUM ASS'Y DUH-24A-R**
M1002	**8-838-019-01**	**DC, BHF-1600A "CAPSTAN"**
M1003	**8-835-047-01**	**DC, MNR-4000A "REEL"**
M1004	**8-835-056-01**	**DC, DNR-1002A "THREADING"**
M1005	**8-835-055-01**	**DC, DNR-4700A "CASSETTE COMPARTMENT"**
ME1001	**1-520-353-00**	**AUDIO CH-1**
ME1002	**1-520-353-00**	**AUDIO CH-2**
ME1003	**1-520-440-00**	**VIDEO/TRACKING**
PL1001	**1-518-455-00**	**12V, 55mA CASSETTE COMPARTMENT**
PL1002	**1-518-455-00**	**12V, 55mA CASSETTE COMPARTMENT**
PL1003	**1-518-455-00**	**12V, 55mA CASSETTE COMPARTMENT**
PM1001	**1-454-285-00**	**12V, 8/52 OHM "TAKE UP IDLER"**
PM1002	**1-454-284-00**	**12V, 10/90 OHM "TAKE UP BRAKE"**
PM1003	**1-454-284-00**	**12V, 10/90 OHM "FF SEARCH"**
PM1004	**1-454-285-00**	**12V, 8/52 OHM "SUPPLY IDLER"**
PM1005	**1-454-284-00**	**12V, 10/90 OHM "SUPPLY BRAKE"**
PM1006	**1-454-283-00**	**12V, 80 OHM "SKEW"**
PM1007	**1-454-284-00**	**12V, 10/90 OHM "SEARCH"**
PM1008	**1-454-286-00**	**12V, 6/35 OHM "PINCH"**
Q1001	**8-760-222-01**	**2SA762**
Q1002	**8-760-222-01**	**2SA762**
Q1003	**8-729-325-67**	**2SD256-Y**
Q1004	**8-729-325-67**	**2SD256-Y**

Ref. No.	Parts No.	Description
R1001	**1-207-619-00**	**WIREWOUND 0.82 3W**
RV1001	**1-228-218-00**	**VAR, CARBON 500 x 2 "HEADPHONES LEVEL"**
⚠ **S1001**	**1-553-159-00**	**ROCKER "POWER"**
S1003	**1-516-779-XX**	**SLIDE "COLOR FRAMING"**
S1004	**1-516-779-XX**	**SLIDE "MONITOR TV"**

NOTES:

1. **The shaded and ⚠ -marked components are critical to safety.**
   Replace only with same components as specified.
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

FRAME, UR-02 (C), UR-02 (M)

SWITCHING REGULATOR

Ref. No.	Parts No.	Description
⚠	**1-413-075-00**	**UR-02 (C, M, S BOARDS)**

C BOARD (IN THE UR-02)

Ref. No.	Parts No.	Description
	1-605-679-00	PRINTED CIRCUIT BOARD, C
C301	**1-130-652-00**	**POLYPROPYLENE 3600PF 100V**
C302	**1-130-018-00**	**POLYPROPYLENE 1000PF 50V**
C305	**1-161-632-00**	**METALLIZED POLYESTER 0.1 50V**
C306	**1-161-632-00**	**METALLIZED POLYESTER 0.1 50V**
D301	**8-719-200-02**	**10E-2**
D302	**8-719-100-70**	**RD15E-B1**
D303	**8-719-815-85**	**1S1585**
IC301	**8-759-904-94**	**TL494CN (TI)**
Q301	**8-729-117-54**	**2SA1175**
⚠ **R302**	**1-247-099-00**	**NONFLAMMABLE, CARBON 47 1/4W**
RV301	**1-226-826-00**	**VAR, METAL 300 (B)**

M BOARD (IN THE UR-02)

Ref. No.	Parts No.	Description
⚠	1-605-531-00	PRINTED CIRCUIT BOARD, M
	2-430-750-00	5P CONNECTOR PIN
	2-430-781-00	6P CONNECTOR PIN
C101	**1-130-711-00**	**METALLIZED POLYESTER 0.22 250V**
C102	**1-161-738-00**	**CERAMIC 4700PF 400V**
C103	**1-161-738-00**	**CERAMIC 4700PF 400V**
C104	**1-161-738-00**	**CERAMIC 4700PF 400V**
C105	**1-161-738-00**	**CERAMIC 4700PF 400V**
C106	**1-161-742-00**	**CERAMIC 2200PF 400V**
C107	**1-161-742-00**	**CERAMIC 2200PF 400V**
C108	**1-161-742-00**	**CERAMIC 2200PF 400V**
C109	**1-161-742-00**	**CERAMIC 2200PF 400V**
C111	**1-125-268-00**	**ELECT 47 400V**
C112	**1-125-267-00**	**ELECT 300 400V**
C113	**1-123-659-00**	**ELECT 4.7 250V**
C114	**1-123-659-00**	**ELECT 4.7 250V**
C115	**1-130-808-00**	**METALLIZED POLYESTER 0.22 400V**
C201	**1-161-913-00**	**CERAMIC 680PF 500V**
C204	**1-161-913-00**	**CERAMIC 680PF 500V**
C205	**1-108-868-00**	**POLYESTER 0.047 50V**
C206	**1-161-632-00**	**METALLIZED POLYESTER 0.1 50V**
C207	**1-161-632-00**	**METALLIZED POLYESTER 0.1 50V**
C208	**1-161-632-00**	**METALLIZED POLYESTER 0.1 50V**
C210	**1-123-326-00**	**ELECT 3300 16V**
C211	**1-123-326-00**	**ELECT 3300 16V**
C212	**1-123-326-00**	**ELECT 3300 16V**
C213	**1-123-326-00**	**ELECT 3300 16V**
C214	**1-161-632-00**	**METALLIZED POLYESTER 0.1 50V**
C215	**1-161-925-00**	**CERAMIC 100PF 500V**
C217	**1-161-915-00**	**CERAMIC 1000PF 500V**
C218	**1-161-915-00**	**CERAMIC 1000PF 500V**
⚠ CN101	1-560-437-00	4P AC IN
CN201	1-560-438-00	5P OUT

NOTES:

1. **The shaded and ⚠ -marked components are critical to safety. Replace only with same components as specified.**
2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

Ref. No.	Parts No.	Description
⚠ D101	8-719-136-00	AC03FGM
D102	8-719-911-55	UO5G
D103	8-719-911-55	UO5G
D104	8-719-911-55	UO5G
D105	8-719-911-55	UO5G
D201	8-719-903-02	ESAC33-02C
D202	8-719-903-02	ESAC33-02C
D203	8-719-903-02	ESAC33-02C
D204	8-719-111-44	F114D
D205	8-719-100-70	RD15E-B1
D206	8-719-200-02	10E-2
⚠ F101	1-532-604-00	THERMAL 5A, 250V, 126°C
⚠ L101	1-459-215-00	CHOKE
⚠ L102	1-459-215-00	CHOKE
L201	1-421-398-00	CHOKE
L202	1-421-370-00	CHOKE
L203	1-421-431-00	CHOKE
⚠ Q101	8-729-993-83	2SC2938
⚠ Q102	8-729-993-83	2SC2938
Q201	8-729-331-53	2SC2315
⚠ R101	1-205-631-00	NONFLAMMABLE, CEMENT 15 5W
R103	1-247-087-00	NONFLAMMABLE, CARBON 15 1/4W
R104	1-247-087-00	NONFLAMMABLE, CARBON 15 1/4W
R107	1-247-103-00	NONFLAMMABLE, CARBON 68 1/4W
R201	1-205-641-00	NONFLAMMABLE, CEMENT 330 5W
R202	1-535-369-00	20mΩ, 2W
⚠ R204	1-202-860-00	NONFLAMMABLE, SOLID 100 1/4W
R205	1-535-369-00	20mΩ, 2W
⚠ R206	1-247-090-00	NONFLAMMABLE, CARBON 20 1/4W
R207	1-532-605-00	CURRENT FUSE, 400mA
⚠ R208	1-202-860-00	NONFLAMMABLE, SOLID 100 1/4W
R209	1-202-860-00	NONFLAMMABLE, SOLID 100 1/4W
⚠ T101	1-447-052-00	MAIN CONVERTER
T102	1-421-468-00	LINE FILTER
T103	1-447-106-00	DRIVE
T104	1-447-053-00	STARTER
T201	1-421-467-00	CHOKE

NOTES:

1. **The shaded and ⚠ -marked components are critical to safety.**
   Replace only with same components as specified.

2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

Ref. No.	Parts No.	Description
S BOARD (IN THE UR-02)		
	⚠ 1-605-532-00	PRINTED CIRCUIT BOARD, S
C001	**1-108-833-00**	**POLYESTER 4700PF 50V**
⚠ **D001**	**8-719-900-95**	**VO9G**
D002	**8-719-900-95**	**VO9G**
D003	**8-719-151-07**	**RD5.1E-B**
D004	**8-719-815-85**	**1S1585**
D005	**8-719-815-85**	**1S1585**
D006	**8-719-815-85**	**1S1585**
D007	**8-719-815-85**	**1S1585**
D008	**8-719-100-24**	**RD4.3E-B3**
Q001	**8-729-175-22**	**2SC2752**
Q002	**8-729-115-64**	**2SA1156**
Q003	**8-729-100-13**	**2SC2001**
R003	**1-247-115-00**	**NONFLAMMABLE, CARBON 220 1/4W**
R004	**1-247-115-00**	**NONFLAMMABLE, CARBON 220 1/4W**
R005	**1-247-103-00**	**NONFLAMMABLE, CARBON 68 1/4W**

NOTES:

1. **The shaded and ⚠ -marked components are critical to safety.**
Replace only with same components as specified.

2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

15-4. PACKING MATERIAL AND ACCESSORY (SUPPLIED)

⚠ 1-534-698-XX	**CORD, POWER (FOR AEP)**
⚠ 1-534-819-00	**CORD, POWER (FOR UK)**
3-668-992-00	CUSHION (LOWER, FRONT)
3-668-993-00	CUSHION (LOWER, REAR)
3-668-994-00	CUSHION (UPPER, REAR)
3-668-995-00	CUSHION (UPPER, FRONT)
3-669-937-00	CARTON, INDIVIDUAL
3-701-632-00	**BAG, POLY**
3-701-648-00	**BAG, POLY**
⚠ 3-783-528-13	**MANUAL, INSTRUCTION**

15-5. FIXTURE (OPTIONAL)

J-6001-820-A	**DRUM ECCENTRICITY GAUGE (3)**
J-6001-830-A	**DRUM ECCENTRICITY GAUGE (2)**
J-6001-840-A	**DRUM ECCENTRICITY GAUGE (1)**
J-6001-930-A	**DRUM ECCENTRICITY GAUGE (4)**
J-6002-290-A	**DIHEDRAL ADJUSTING SCREW**
J-6009-830-A	**FLATNESS PLATE**
J-6130-010-A	**REEL TABLE HEIGHT CHECK BASE JIG**
J-6130-020-A	**REEL TABLE HEIGHT CHECK JIG**
J-6150-020-A	**PINCH LEVER ADJUSTMENT JIG**
Y-2031-001-0	**CLEANING FLUID**
2-034-697-00	**CLEANING PIECE**
3-702-215-01	**TORQUE MEASUREMENT TAPE (100 mm DIA.)**
3-702-216-01	**BACK TENSION ADJUSTMENT JIG**
7-661-018-01	**SONY OIL**
7-732-050-20	**TENSION SCALE (50 g FULL SCALE)**
7-732-050-30	**TENSION SCALE (100 g FULL SCALE)**
7-732-050-40	**TENSION SCALE (200 g FULL SCALE)**
7-732-050-50	**TENSION SCALE (500 g FULL SCALE)**
8-960-015-63	**ALIGNMENT TAPE, RR5-2SA-PAL**
9-911-053-00	**THICKNESS GAUGE**

Standard products Head Demagnetizer, HE-4

NOTES:

1. **The shaded and ⚠ -marked components are critical to safety.**
   Replace only with same components as specified.

2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

9-966-669-04

Sony Corporation

1984. 1 1118.5-1

© Printed in Japan